Carbon Sequestration Study

An analysis of geological and terrestrial carbon sequestration regulatory and policy issues

A Report to the *61st* Legislature of the
State of Montana by the
Energy and Telecommunications Interim Committee

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Cover photo: Colstrip Steam Electric Station.
Courtesy of PPL.

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Energy and Telecommunications Interim Committee
2007-08 Interim

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This report is a summary of the work of the Energy and Telecommunications Interim Committee. This summary is specific to the ETIC's study of carbon sequestration. Throughout the interim, the ETIC reviewed volumes of information on the topic. Special thanks are extended to the Montana Board of Oil and Gas Conservation, Department of Environmental Quality, and Big Sky Carbon Sequestration Partnership, who were instrumental in the preparation of this report. A complete catalog of information, including written minutes and, in some cases, audio minutes, is available on the ETIC website:
www.leg.mt.gov/etic

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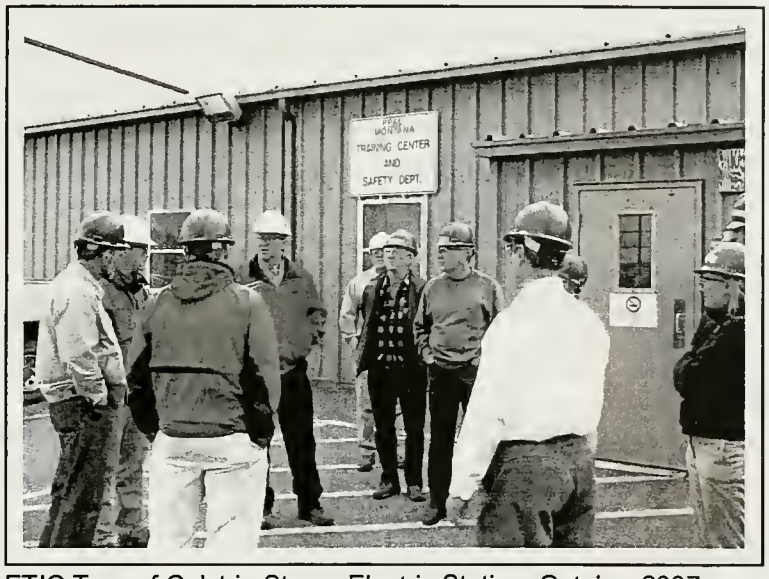
Introduction

With the first meeting of the 2007-08 Energy and Telecommunications Interim Committee (ETIC) in July 2007, ETIC members ventured into what is widely referred to as the "carbon conundrum". Although not the subject of an assigned study bill, members reached a consensus that a significant portion of ETIC time for the interim would be spent considering a potential policy or regulatory framework as it relates to carbon sequestration in Montana.

Members adopted a work plan requiring a study of specific aspects of sequestration to determine where modifications to existing law or additions to the law merited consideration. To reach its goal in October 2007, the ETIC traveled to Colstrip to visit the Colstrip Steam Electric Station—a power plant fueled by coal that generates about 2,100 megawatts of electricity. Members toured the plant and received information on retrofitting existing plants in Montana to operate in a potentially carbon-constrained environment and learned about the feasibility of sequestration overall in Montana.



ETIC Tour of Colstrip Steam Electric Station, October 2007. Photo courtesy of Lindsey Waggoner, outreach coordinator, Big Sky Carbon Sequestration Partnership.

In late 2007, the Environmental Protection Agency (EPA) announced its plans to develop rules to ensure that geological carbon sequestration wells are constructed and managed in a manner that protects underground sources of drinking water. The draft rules were released in July 2008, but those rules aren't expected to be final until late 2010 or 2011. Without the final rules and with questions remaining about the role of the federal government, the ETIC was limited in its ability to completely address the regulatory issues raised by carbon sequestration. In an April 2008 letter to the Montana Board of Oil and Gas

Conservation, which was shared with the ETIC, the EPA made it very clear that the agency will provide overall regulatory guidance on the issue.

> EPA recognizes several state legislatures have enacted new laws aimed at accelerating efforts to contain carbon emissions within their jurisdictions and that some states may be working to publish their own GS [geologic sequestration] program regulations this year. It is important for state program managers to understand that, under the Safe Drinking Water Act, state requirements must be at least as stringent as the federal requirements in order to receive EPA approval. Thus, if regulations are issued prior to EPA regulations, it may eventually be necessary to revise state UIC [underground injection control] program requirements in order to obtain EPA approval.

The complete letter is included in **Appendix A**.

Throughout the ETIC's study, the public was invited to weigh in on the subject. During the interim, the ETIC heard from some of the state's and nation's experts on the subject of sequestration.

Based on the work plan adopted by the ETIC in 2007, members reviewed seven specific issues:

1. Feasibility of geological and terrestrial carbon sequestration in Montana and the characteristics of areas of the state where carbon could be sequestered.
2. Methods and technologies for the geological and terrestrial sequestration of carbon.
3. Findings and recommendations of the Montana Climate Change Advisory Committee (MCCAC) related to carbon sequestration.
4. An inventory of sources and volumes of carbon produced in Montana.
5. Existing state and federal regulations governing carbon sequestration.
6. Liability issues related to sequestration and legal issues related to ownership rights.
7. Costs and benefits of carbon sequestration.

After completing the interim study tasks as outlined in **Appendix B**, ETIC members reached an agreement to issue a report with findings on the subject of sequestration, as

well as to develop two bill drafts for ETIC discussion. The ETIC, however, did not ultimately vote to pursue those bill drafts.

The first bill draft that was discussed was LC4002. It established the surface owner as the owner of pore space used for the storage of carbon dioxide or other substances. The bill protected existing oil and gas statutes and affirmed the dominance of the mineral estate. Based on public comment that the ETIC received, members voted 6 to 1 to not pursue LC4002. The bill draft and the public comment that the ETIC received are included in **Appendix C**.

A second ETIC bill draft, LC4003, was a study bill. ETIC members proposed a study bill limited to the subjects of jurisdiction, liability, and cost. If approved, the bill would have charged the ETIC with completing a study, more indepth than that which is included in this report, during the 2009-10 interim. The ETIC in July voted 6 to 1 not to pursue the study bill but to instead examine a study resolution at its September 2008 meeting. During the September meeting, the study resolution failed to gain the approval of the ETIC on a 5 to 1 vote.

This report is based on the most up-to-date information available. It is intended to outline the processes and information used by the ETIC in reaching its conclusions.

ETIC Carbon Sequestration Findings

1. Feasibility of geological and terrestrial carbon sequestration in Montana and the characteristics of areas of the state where carbon could be sequestered.

Finding: The Big Sky Carbon Sequestration Partnership, based in Bozeman, is examining the feasibility of both geological and terrestrial sequestration in Montana.

Finding: The Big Sky Carbon Sequestration Partnership has found that CO_2 sequestration storage potential in depleted oil and gas fields in the region is about 1 billion metric tons of CO_2. Saline aquifers present about 200 billion metric tons of CO_2 storage potential. Substantial characterization work of these formations and sinks needs to be completed.

Finding: The National Carbon Offset Coalition includes seven Montana nonprofit corporations that help landowners and other public and private organizations participate in market-based conservation programs to offset greenhouse gas emissions.

Finding: Through terrestrial sequestration, major agricultural states can potentially play a role in offsetting greenhouse gas emissions by storing carbon in soils.

2. Methods and technologies for the geological and terrestrial sequestration of carbon.

Finding: As identified by the Big Sky Carbon Sequestration Partnership, the region including Montana has a range of geological sites for CO_2 storage, including depleted oil reservoirs, unminable coal seams, saline aquifers, and basalt formations. The type of geological sites used for sequestration will be determined in part by the state's geography, and at this time, it is unknown how many such sites may be useful for sequestration specific to Montana. Basalt formations, for example, are primarily found in Washington, Oregon, and Idaho.

Finding: Terrestrial carbon sequestration can include cropping and tilling practices, grazing practices, methane offsets, and forestry and afforestation. The Big Sky Carbon Sequestration Partnership is engaged in projects to quantify and verify some types of terrestrial sequestration opportunities.

3. Findings and recommendations of the Montana Climate Change Advisory Committee (MCCAC) related to carbon sequestration.

Finding: The MCCAC offered 54 policy recommendations for reducing greenhouse gas emissions in the state to1990 levels by 2020 and in November 2007

released the Montana Climate Change Action Plan outlining each of the recommendations.

Finding: During the 2007-08 interim, the Environmental Quality Council conducted an indepth review of the recommendations, pursuing aspects through draft legislation and reports.

4. An inventory of sources and volumes of carbon produced in Montana.

Finding: Activities in Montana account for about 37 million metric tons of carbon dioxide equivalent emissions or 0.6% of all greenhouse gas emissions in the United States. Electricity use, transportation, and agriculture are the principal emissions sources.

Finding: An Energy Information Administration report (based on 2004 data and released in 2008) shows 35.1 million metric tons of CO_2 being emitted in Montana, 19.1 million metric tons resulting from electric power production.

5. Existing state and federal regulations governing carbon sequestration.

Finding: There is a limited framework of existing statutes regarding carbon sequestration. However, many states are working through policy discussions that deal with regulatory frameworks related to CO_2 storage. Wyoming, in 2007, was the first state to adopt an indepth regulatory scheme.

Finding: Two bills were passed and approved during Montana's 2007 legislative and special sessions that address the carbon issue—House Bill No. 25 (HB 25), approved during the regular 2007 session, and House Bill No. 3 (HB 3), approved during the 2007 special session. Both bills address, to some degree, the issue of carbon sequestration, particularly as it applies to power generation and equipment.

Finding: The Interstate Oil and Gas Compact Commission (IOGCC) in 2007 drafted a report that includes a series of recommendations on a CO_2 framework. The report analyzes technical, policy, and regulatory issues related to the storage of carbon dioxide in the subsurface, including oil and natural gas fields, saline formations, and coal beds.

Finding: In October 2007, the EPA announced plans to establish rules for geological sequestration and in July 2008 released draft rules. The EPA currently uses the Class V experimental technology well permits for pilot CO_2 sequestration projects. The new regulations will ensure that a permitting system for CO_2 injection is consistent with what is now under the Safe Drinking Water Act of 1974. The Safe Drinking Water Act is established under the Underground Injection Control (UIC) program. The EPA

has proposed draft regulatory changes to the UIC program that were not final at the time of this report's completion.

Finding: The Energy Independence and Security Act of 2007 appears to give the EPA explicit authority under the Safe Drinking Water Act to regulate the injection of carbon dioxide. The outcome of additional federal legislation on sequestration remained uncertain at the close of the 2007-08 interim.

6. Liability issues related to sequestration and legal issues related to ownership rights.

Finding: Because there are a number of unknowns about carbon sequestration and because jurisdictional questions remain, the issues of liability will likely evolve as additional regulatory issues are determined.

Finding: The question of liability may be addressed differently, depending on whether the stored carbon is considered a pollutant or a commodity. Potential responsible parties for carbon sequestration could include: storage site landowners, injectors, operators, transporters, generators, lenders, or contractors. Transfer of liability to government also has been discussed.

Finding: In looking at other states for guidance in this area, there are limited examples. Wyoming has not addressed the liability issue, but has created a task force to further examine related matters. Other states continue to examine the issue. Texas, for example, approved legislation accepting liability for CO_2 stored underground in FutureGen projects.

Finding: The Wyoming Legislature established that pore space is owned by the surface owner, and the ETIC discussed similar draft legislation but did not opt to pursue it.

7. Costs and benefits of carbon sequestration.

Finding: The costs of carbon capture and sequestration are uncertain and may be determined in part by successful commercial demonstrations of carbon capture and storage, by carbon market prices, and by state and federal decisions regulating carbon emissions.

Finding: There are a variety of risks associated with sequestration, including leaks to the surface, which in large amounts could be dangerous to human life, the potential for potable aquifer contamination, and the possible risk of induced seismicity because of movement of displaced fluids.

Finding: Benefits range from reducing greenhouse gas emissions to providing new markets for the agriculture industry. The National Energy and Technology

Laboratory notes that sequestration works toward implementation of national energy policy goals to develop new technologies and supports international collaborations to reduce greenhouse gas emissions and intensity. Sequestration can provide potential economic benefits in oil and gas fields via enhanced oil recovery.

Feasibility

As constraints on carbon emissions are increasingly discussed, many experts consider carbon capture and sequestration a viable option in the energy industry's near future.

ETIC Tour of Colstrip Steam Electric Station, October 2007.
Photo courtesy of Lindsey Waggoner, outreach coordinator, Big Sky Carbon Sequestration Partnership.

About 50% of the electricity generated in the U.S. is from coal, according to federal Energy Information Administration 2005 annual statistics. At the same time, one 500 megawatt coal-fired power plant produces about 3 million tons of carbon dioxide each year, according to a Massachusetts Institute of Technology study of coal.[1]

Montana is endowed with a wealth of coal, reserves totaling 119.2 billion tons, roughly 25% of the United State's total.[2] There are also ongoing efforts to mine Montana coal and use it to generate electricity and even refine it into a liquid fuel source. The MIT study, which was published in 2007, declares carbon capture and sequestration "the critical enabling technology to help reduce CO_2 emissions significantly while also allowing coal to meet the world's pressing energy needs".[3]

As illustrated in **Figure 1**, geological carbon sequestration is the process of trapping carbon dioxide after it is created from the production, processing, and burning of coal, gas, and oil and injecting it underground.

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[1] *The Future of Coal: Options for a Carbon-Constrained World,* An Interdisciplinary MIT Study, 2007, Executive Summary, page IX.

[2] http://montanacoalcouncil.com/facts_figures.html

[3] *The Future of Coal: Options for a Carbon-Constrained World,* An Interdisciplinary MIT Study, 2007, Executive Summary, page X.

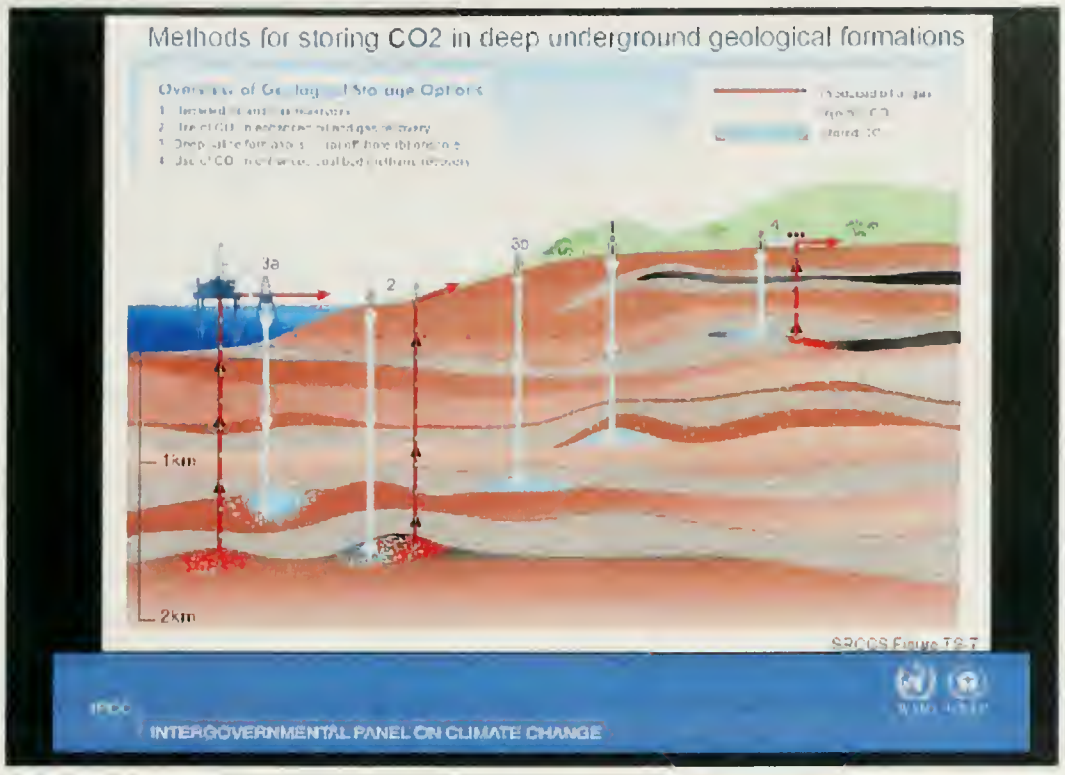


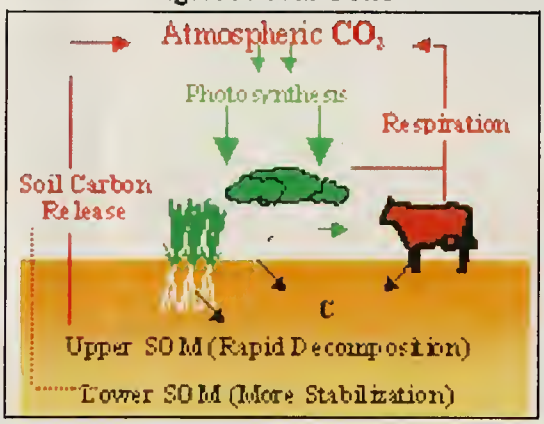
Figure 1
Source: Intergovernmental Panel on Climate Change

Terrestrial sequestration is the process through which carbon dioxide from the atmosphere is absorbed by trees, crops, or plants through photosynthesis and stored as carbon in biomass, like tree branches or soils.[4] Forests and croplands are often called carbon "sinks" because they sequester more carbon than the amount of carbon released during forestry or agricultural activities. **Figure 2** shows this process.

Simply put, carbon capture means that the gas doesn't enter the atmosphere. By capturing carbon dioxide at industrial plants, carbon can be kept out of the atmosphere.

[4] U.S. Environmental Protection Agency Carbon Sequestration in Agriculture and Forestry, http://www.epa.gov/sequestration/faq.html.

Figure 2. Carbon Sequestration in Agricultural Soils



Source: USGS, "Carbon Sequestration in Soils," at [http://edcintl.cr.usgs.gov/carbonoverview.html].
SOM = Soil organic matter

In terms of geological sequestration, there is an opportunity to store carbon deep under the earth's surface. Worldwide estimates of carbon storage capacity range from 2 trillion to 10 trillion tons of CO_2.[5] In 2005, worldwide carbon emissions reached 28 billion tons, according to the U.S. Department of Energy's Energy Information Administration.[6]

In Montana, storage capacity and potential storage locations are being studied by the Big Sky Carbon Sequestration Partnership. It has examined areas of Montana where geological sequestration is likely. This information is included in **Figure 3**. Another map is available online under "publications" and "staff reports" at www.leg.mt.gov/etic. The Big Sky Carbon Sequestration Partnership, led by Montana State University, is one of the U.S. Department of Energy's seven regional partnerships. Researchers are developing a framework to address carbon dioxide emissions and are working with stakeholders to create a "vision for a new, sustainable energy future."[7]

Terrestrial sequestration offers another opportunity. The National Carbon Offset Coalition includes seven Montana nonprofit corporations that help landowners and other public and private organizations participate in market-based conservation programs to offset greenhouse gas emissions. The Coalition has developed a handbook to help landowners plan carbon sequestration efforts and document those efforts, making them marketable.[8] Technical consulting is provided in part by the

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[5] http://news-service.stanford.edu/news/2007/june13/carbon-061307.html

[6] http://www.eia.doe.gov/pub/international/iealf/tableh1co2.xls

[7] http://www.bigskyco2.org/

[8] http://www.ncoc.us/

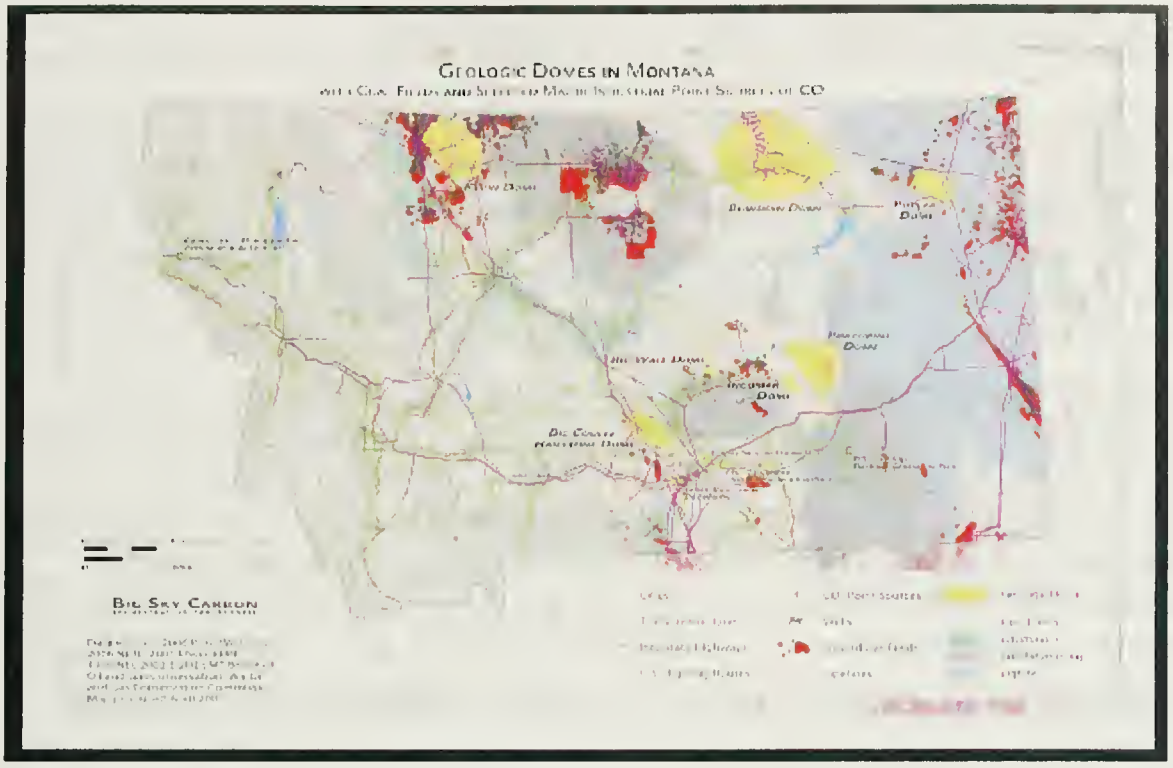

Figure 3
Source: Big Sky Carbon Sequestration Partnership

Chicago Climate Exchange, the world's first marketplace for integrating emissions reductions with emissions trading and offsets.

Methods and Technologies

The Department of Energy has formed seven regional partnerships that are testing the feasibility of sequestration. The Big Sky Carbon Sequestration Partnership is working to identify and verify the most promising technologies in Montana, Wyoming, Idaho, South Dakota, Washington, and Oregon. Researchers rely on existing technologies from the fields of engineering, geology, chemistry, biology, geographic information systems (GIS), and economics to develop novel approaches for both geological and terrestrial carbon storage in the region. The Partnership engages in cutting-edge carbon sequestration research and development; economic and regulatory analyses; public education and outreach; and regional demonstration projects to deploy new technologies.[9] The Partnership also is examining the infrastructure that will be needed to deploy commercial scale carbon sequestration projects. "This supporting infrastructure includes a geographic information system [GIS]-based economic and risk assessment tool to help determine optimal energy development strategies, regulatory and permitting approaches, and enhanced public understanding and acceptance."[10]

❑ Geological Carbon Sequestration

To capture carbon, CO_2 is extracted from waste gases created during fossil fuel combustion. It is then injected underground and stored. Many different types of capture and sequestration are under review by a variety of researchers in the world. In geological sequestration, the carbon dioxide is stored for long terms underground. As identified by the Big Sky Carbon Sequestration Partnership, the region including Montana has a range of geological sites for CO_2 storage, including depleted oil reservoirs, unminable coal seams, saline aquifers, and basalt formations. The Partnership has found that CO_2 sequestration storage potential in depleted oil and gas fields in the region is about 1 billion metric tons of CO_2. Saline aquifers in the region present about 200 billion metric tons of CO_2 storage potential. A site where injection occurs must have sufficient permeability and porosity to accept the gas. The formation needs to be at sufficient depth to maintain the CO_2 in a super critical state through hydrostatic pressure. Ideally, there also are several caprocks to contain the CO_2. Potable water sources above also must be protected.

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[9] Information provided in comments by Big Sky Carbon Sequestration Partnership.

[10] Ibid.

Enhanced oil recovery

Since the early 70s, engineers have been putting carbon dioxide into oil reservoirs to increase oil production. Enhanced oil recovery (EOR), in most cases currently, is the process of using alternate flows of water and carbon dioxide that are pumped into an oil reservoir to push additional oil to production wells. There also are other methods to apply CO_2 flooding. An oversimplified explanation is that the carbon dioxide makes the oil expand so that it flows more easily. In the U.S., there are currently 70 CO_2 injection projects, injecting about 35 million tons a year of CO_2 for EOR.[11]

Carbon sequestration for EOR is currently utilized at a coal gasification plant in Beulah, North Dakota. A 204-mile carbon dioxide pipeline from the plant to the Weyburn oil field in Saskatchewan, Canada, transports about 5,000 tons of carbon dioxide a day to the oil fields, where 130 million barrels of oil are expected to be produced during a 20-year project. The project results in an annual 1 million tons of carbon dioxide being sequestered rather than sent into the atmosphere.

In Wyoming, the Enhanced Oil Recovery Institute estimates that about 20 trillion cubic feet of CO_2 could be sequestered and used in Wyoming's oil fields. Rancher Energy Corporation is beginning work on a CO_2 EOR project in the South Glenrock and Big Muddy fields east of Casper, Wyoming.

The Enhanced Oil Recovery Institute estimates that as much as 60% of original oil reserves can remain unproduced after conventional recovery methods are used.[12] The Big Sky Carbon Sequestration Project also is working in Wyoming and looking at EOR.

Wyoming industry officials are working to develop a wider network of CO_2 pipelines.[13] Oil producers in the southern Powder River Basin have said that they would be interested in purchasing CO_2, if pipelines are developed to link areas to the north and east. **Figure 4** outlines the CO_2 pipeline structure under review in Wyoming. Most CO_2 that is currently used for EOR in the United States comes from natural carbon reservoirs, not carbon recovered from power generation.

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[11] "No Time Like the Present: NRDC's Response to MIT's 'Future of Coal' Report", David Hawkins and George Peridas, 2007, page 4.

[12] http://eori.gg.uwyo.edu/

[13] *Billings Gazette*, "CO2 seen as key", by Dustin Bleizeffer, June 27, 2007.

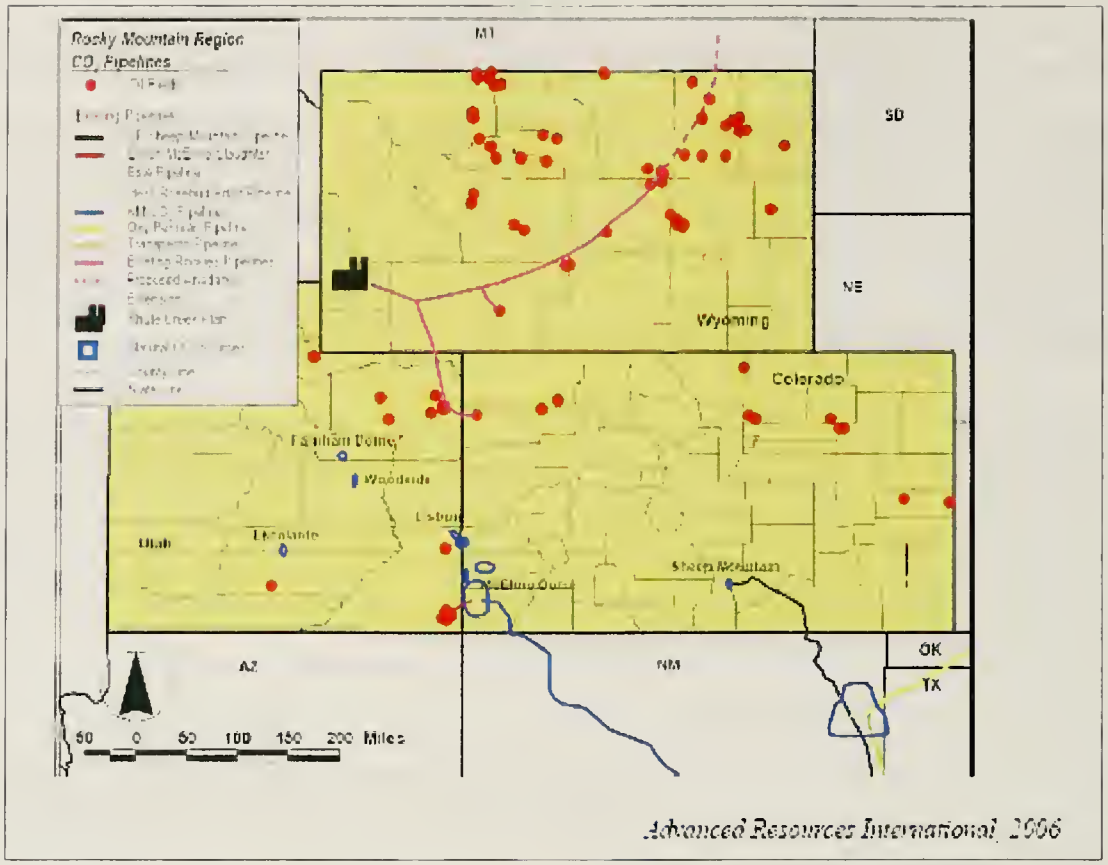

Figure 4
Source: Wyoming Pipeline Authority, 2007

Saline aquifers

In Montana, several saline aquifers, or large geological domes, are being studied as potential long-term storage sites. Potential storage sites have been identified in several key areas of Montana. The Big Sky Carbon Sequestration Partnership is examining these areas and looking at the potential to permanently store carbon dioxide.

The Kevin Dome in northcentral Montana has been identified as a key area. Its dome structure has the potential to serve as a commercial CO_2 reservoir. Carbon could be removed or piped from the site during periods of high demand for EOR. It also serves as a natural CO_2 reservoir. At the Kevin Dome, carbon would be sequestered 3,500 feet to 5,000 feet underground. The dome has the potential to store 1 to 2 gigatons (a gigaton is equivalent to a billion metric tons) of CO_2. **Figure 5** includes a more indepth look at that dome.

At a large-scale sequestration project in Norway, oil and gas company Statoil is injecting carbon dioxide from its Sleipner West natural gas production facility into an aquifer beneath the North Sea. The project has been underway since 1996, and Statoil reports that seismic surveys show that volumes exceeding the limits of detection are not observed to have moved from the target storage formation. Statoil has put 1 million tons of carbon dioxide into the aquifer annually.[14]

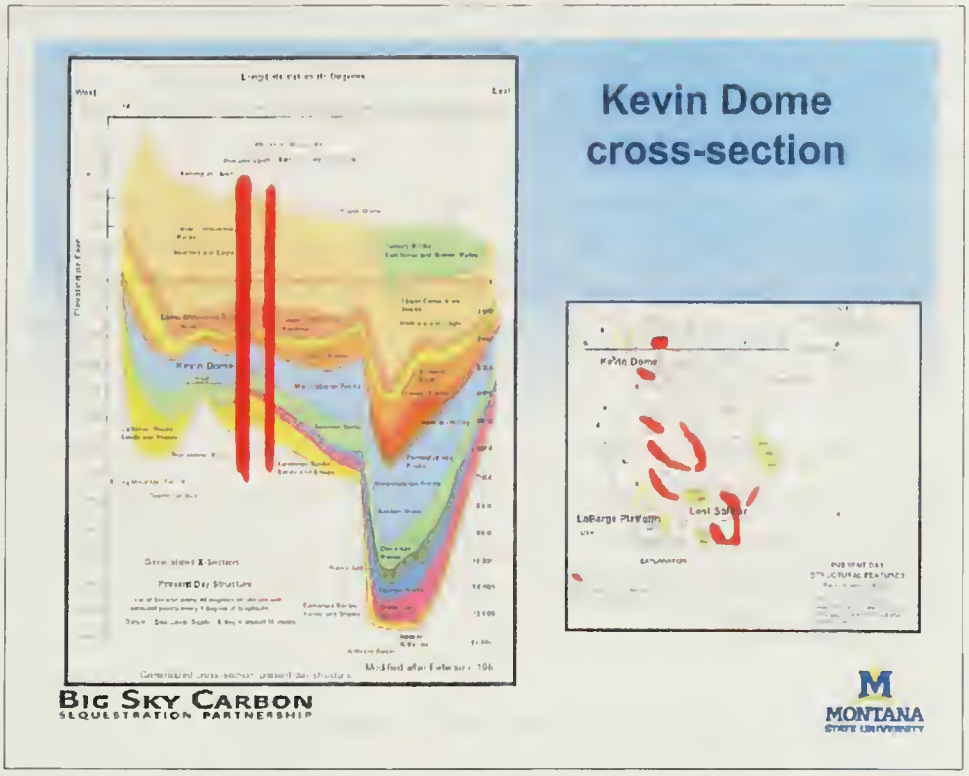

Figure 5
Source: Big Sky Carbon Sequestration Partnership

Unmineable coal seams

Coal beds adsorb CO_2, and injected CO_2 can displace methane, which can be recovered. The injection of carbon dioxide into coal seams can then enhance recovery of coal bed methane.

If a bed is used for sequestration, however, the injected coal cannot be mined in the future.[15] The Midwest Regional Carbon Sequestration Partnership is studying the feasibility of such storage. Some tests have shown that coal will adsorb about twice as

[14] http://www.geotimes.org/mar03/feature_demonstrating.html

[15] *Assessing Carbon Sequestration Potential for "Unmineable" Coal Beds in Eastern Kentucky,* Greb, Weisenfluh, and Eble, Kentucky Geological Survey, University of Kentucky.

much carbon dioxide as methane, which gives it the potential to displace methane and remain underground. Swelling also may accompany the adsorption. Limited field tests have demonstrated CO_2 recovery of coal bed methane, and more study is needed to optimize such a process.[16]

Basalt formations

Within the region being studied by the Big Sky Carbon Sequestration Partnership, volcanic basalt covers 85,000 square miles, and preliminary calculations show that the basalt could store more than 100 billion tons of carbon dioxide. Researchers are testing how well the volcanic rocks below the Columbia and Snake River Plains store carbon dioxide. Researchers will inject 3,000 tons of carbon dioxide about 3,000 feet into Washington State's Columbia River basalt formation in Eastern Washington. The scientists will then track the way that the gas moves underground and watch for leaks. "Basalt formations may offer a unique geological medium for long-term, secure carbon sequestration."[17]

❑ Terrestrial Carbon Sequestration

In the United States, between 6% and 8% of all greenhouse gas emissions are attributed to agricultural activities. Agricultural and forestry practices also can reduce greenhouse gases by maintaining existing carbon storage in trees and soils. A 2007 EPA report showed that carbon sequestration in agricultural soils in 2005 was about 30 million metric tons of CO_2.[18] Forested lands and trees are credited with about 95% of all estimated carbon uptake in the United States, which includes tree planting activities and forest land remaining forest land.[19]

The role of agricultural and forest lands in sequestering carbon is complex, but is increasingly gaining attention as carbon cap-and-trade programs take shape. Carbon sequestration units (CSUs) can be used to represent an amount of organic carbon sequestered in soil or forests that is equivalent to the removal of one metric ton of CO_2

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[16] http://www.netl.doe.gov/publications/factsheets/project/Proj440.pdf

[17] *Big Sky Regional Carbon Sequestration Partnership — Validation Phase*, U.S. Department of Energy, Office of Fossil Energy National Energy Technology Laboratory, February 2007.

[18] EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005,* April 2007. http://epa.gov/climatechange/emissions/usinventoryreport.html

[19] CRS Report for Congress, *Climate Change: The Role of the U.S. Agriculture Sector,* Renee Johnson, updated December 14, 2007.

from the atmosphere. The CSUs can then be packaged into portfolios by groups like the National Carbon Offset Coalition based in Butte and offered for sale on private markets, like the Chicago Climate Exchange. Farmers and ranchers sign up their carbon offsets, and organizations serve as a type of broker. As an example set by the National Carbon Offset Coalition, in Eastern Montana, 28 counties qualify for exchange soil carbon offsets for conservation tillage. Producers can earn carbon credits at a rate of 0.32 metric tons an acre each year during the nonfallow year. Credits can be earned between 2006 and 2010 on registered acres. Carbon exchange rates for rangeland are earned at a rate of 0.12 to 0.24 metric tons an acre each year of CO_2 sequestered on eligible land.

In northcentral Montana, there are at least two projects underway to monitor and verify terrestrial carbon offsets. One project is in its sixth year and is comparing tilled and direct seed systems, including fallow-wheat and lentil-wheat cropping rotations, at six different farms. The locations will be studied and used to generate a regional carbon sequestration rate for tilled systems. A second project is examining soil properties to determine surface soil carbon and to predict soil carbon at depth. Montana State University and the Big Sky Carbon Sequestration Partnership are involved in these as well as additional terrestrial projects.

Cropland

Untilled cropland holds about a third of a ton of carbon an acre, according to National Carbon Offset Coalition figures.[20] Mulch farming and conservation tillage are agricultural processes that return biomass to the soil. Crop rotation, agroforestry systems, and application of biosolids to the soil also increase soil organic carbon. For credit with the National Carbon Offset Coalition, for example, low-residue crops like soybeans, peas, and lentils are eligible if a cover crop is included in the rotation. Pilot projects have shown that changes in cropping practices, like a change from conventional to conservation tillage, can sequester carbon.

Rangeland

Grazing management that employs sustainable stocking rates, rotational grazing, and seasonal use on nondegraded rangelands are considered practices eligible to be integrated into a carbon trading system. Other practices that could apply include restoration of degraded rangelands through sustainable stocking rates, rotational

[20] Estimates of sequestration rates provided by the National Carbon Offset Coalition.

grazing, and seasonable use grazing. Improved rangeland management generally reduces water usage and increases productivity on grasslands. The Big Sky Carbon Sequestration Partnership is continuing with a study started in 1982 that focuses on carbon sequestration management practices on rangeland. Researchers have collected 320 soil samples, showing that grazing intensity has a significant influence on soil organic carbon.[21]

Methane Offsets

The estimated 100 million cattle in the U.S. emit about 5.5 million metric tons of methane each year, around 20% of methane emissions in the nation, according to the EPA.[22] Agricultural methane collection and combustion systems can offset greenhouse gases. Agricultural systems, including covered lagoons, anaerobic digesters, or complete-mix and plug-flow digesters, are all eligible projects. There are multiple other guidelines in this particular area. "The most promising approach for reducing methane emissions from U.S. livestock is by improving the productivity and efficiency of livestock production."[23]

Forestry

Sequestering and retaining increased amounts of carbon from the atmosphere in forests can vary depending on the types of trees. In Idaho, the Nez Perce planted ponderosa pines, Douglas fir, and larch saplings among old-growth stands on land that had been cleared in the past for farming. Estimates there show an acre of pine forest capturing and holding one to two metric tons of CO_2 each year. The Nez Perce tribe has 4,000 acres that it has planted with trees in multiple projects on the reservation.[24] Beetle infestations and drought are among the necessary considerations in forestry-related sequestration. In 2001, for example, the Salish Kootenai sold sequestration rights on 250 acres to a company in London. Drought conditions killed the trees, which all had to be replanted. The Big Sky Carbon Sequestration Partnership is engaged in a forestry field test in the Northern Rockies to quantify sequestration potential in forests.

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[21] *Big Sky Regional Carbon Sequestration Partnership — Validation Phase*, U.S. Department of Energy, Office of Fossil Energy National Energy Technology Laboratory, April 2008.

[22] http://www.epa.gov/rlep/faq.html

[23] Ibid.

[24] "Sale of Carbon Credits Helping Land-Rich, but Cash-Poor, Tribes", *New York Times*, Jim Robbins, May 8, 2007.

Montana Climate Change Advisory Committee

In December 2005, Governor Brian Schweitzer asked Montana's Department of Environmental Quality (DEQ) to form a Montana Climate Change Advisory Committee (MCCAC) to study the impact of climate change in Montana.

The MCCAC was made up of 18 members representing industry, environment, local and tribal governments, transportation, and agriculture.[25] The DEQ contracted with the Center for Climate Strategies to develop a comprehensive inventory and forecast of greenhouse gas emissions in Montana from 1990 to 2020. The Center for Climate Strategies, a nonprofit organization that works with groups like the MCCAC to design and implement policies that address climate mitigation, facilitated development of Montana's plan.

The Center for Climate Strategies also worked with the MCCAC to develop possible policy options for reducing greenhouse gas emissions. Five technical working groups were organized to advise the full MCCAC and provide technical analysis. The five groups included agriculture, forestry, and waste; energy supply; residential, commercial, and industrial; transportation and land use; and cross-cutting issues. The energy supply technical working group, for example, examined greenhouse gas reductions and the cost-effectiveness of environmental portfolio standards, renewable energy incentives, and market-based carbon issues, like a carbon tax.

The MCCAC voted on individual policy recommendations that were presented to the Governor in November 2007 for possible implementation. The MCCAC reached a consensus on 54 policy recommendations for reducing greenhouse gas emissions in the state to1990 levels by 2020 and released the Montana Climate Change Action Plan outlining each of the recommendations.[26]

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[25] A full list of the Montana Climate Change Advisory Committee is available at http://www.mtclimatechange.us/ewebeditpro/items/O127F11863.pdf.

[26] The Montana Climate Change Action Plan can be viewed at http://www.mtclimatechange.us/CCAC.cfm.

The MCCAC reached agreement on recommendations based on those options in early July 2007. The energy supply recommendations are included in **Appendix D**.

Emissions in Montana

The Center for Climate Strategies prepared a greenhouse gas inventory under a contract with the DEQ. The report was prepared to assist the MCCAC. The inventory includes carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Aerosol emissions, including "black carbon" from fossil fuel combustion, also were included. Emissions inventoried in the report do not solely include carbon dioxide but instead include a common metric, CO_2 equivalent.

Montana's gross greenhouse gas emissions are rising at about the same rate as the nation's on the whole.[27] Montana's emissions per capita are higher, primarily because of the state's fossil fuel production industry, agricultural industry, large distances for transportation, and low population density. Forestry activities are estimated to be net sinks for emissions, and agricultural soils are estimated to sequester additional gases. The inventory shows that activities in Montana account for about 37 million metric tons of carbon dioxide equivalent emissions or 0.6% of all greenhouse gas emissions in the United States. Electricity use, transportation, and agriculture are the principal emissions sources. The combustion of fossil fuels for generating electricity used in Montana combined with the transportation sector account for about 50% of the gross greenhouse gas emissions in the state.[28] Agricultural emissions are primarily methane and nitrous oxide from manure management, fertilizer use, and livestock. Other types of emissions are from households, large industry, commercial business, wastewater treatment operations, and the oil and gas industry. A more detailed look at emissions in Montana is included in **Figure 6**.

The report also includes emissions from electricity production, which are discussed in this report. Historically, Montana has produced about twice as much electricity as was consumed in the state. As an example, in 2000, Montana exported 41% of the electricity that it produced, according to the inventory. That same year, emissions associated with electricity consumption were 9.5 million metric tons of CO_2 equivalent—significantly lower than emissions associated with electricity production,

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[27] *Montana GHG Inventory and Reference Case Projections 1990-2020*, Center for Climate Strategies, principal authors: Alison Bailie, Stephen Roe, Holly Lindquist, and Alison Jamison, September 2007, page 4.

[28] Ibid. page 5.

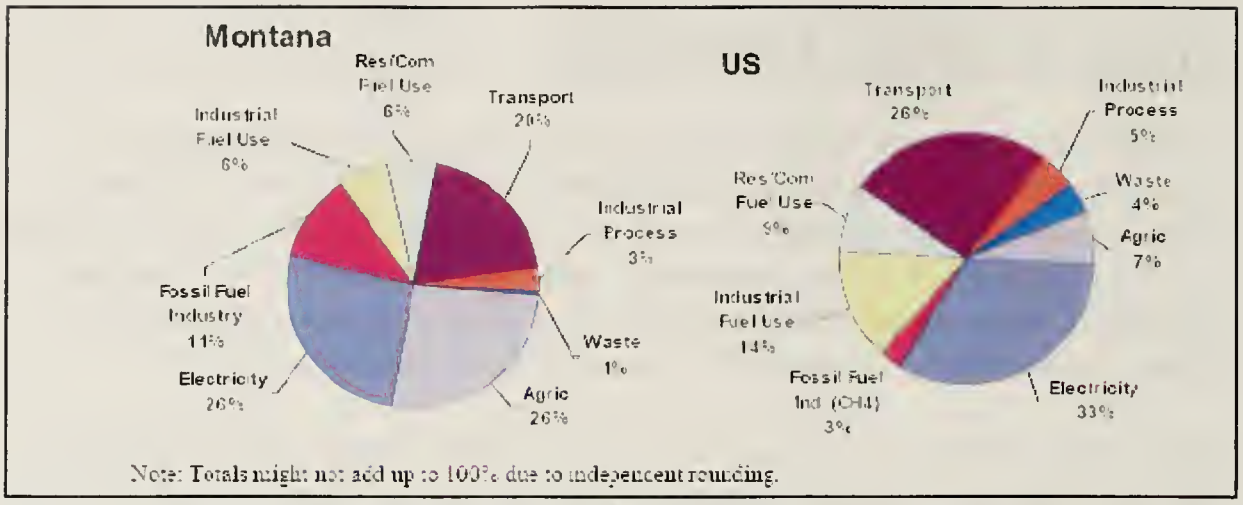

Figure 6 Gross GHG emissions by sector, 2000, Montana and US
Source: *Montana GHG Inventory and Reference Case Projections 1990-2020*

which were 17.1 million metric tons of CO_2 equivalent.[29] These numbers also may require additional scrutiny because much of the energy exported in Montana is generated by hydroelectric facilities.

Under what is referred to as a "business as usual" approach, Montana's greenhouse gas emissions are expected to increase, climbing to 42 million metric tons by 2020 or 30% above 1990 levels, according to the inventory. Transportation is expected to be the largest contributor to future emissions, followed by the electric sector. The estimates are based on a scenario in which no coal-to-liquids facilities are operating in the state. The inventory also contemplated a "high fossil fuel production" scenario with two coal-to-liquids plants being developed. That scenario assumes that additional electricity transmission lines are developed between Montana and the southern United States and from Montana to Alberta, Canada. The additional capacity on those lines is assumed to be used by a mix of 65% circulating fluidized bed coal electricity production and 35% wind energy production. The scenarios also show natural gas production tripling over current levels and refining capacity increasing. Under those assumptions, emissions reach 52 million metric tons in 2020.[30] In 2007, coal accounted for 64% of electricity generation in Montana, and hydropower accounted for 34%.[31] Total greenhouse gas

[29] Ibid.

[30] Ibid. page 10.

[31] "The Electricity Law Handbook: A Montanan's Guide to Understanding Electricity Law", revised 2008, page 44.

emissions from the four largest Montana plants totaled 18 million metric tons of $C0_2$-equivalent in 2004. Colstrip, the largest plant, accounts for 82% of Montana's greenhouse gas emissions from power plants.[32]

A 2005 Energy Information Administration (EIA) report uses 1990 to 2004 data to calculate state-level emissions from fuel categories, including coal, natural gas, and petroleum products. The EIA report (released in 2008) shows 35.1 million metric tons of CO_2 being emitted in Montana, 19.1 million metric tons resulting from electric power.[33] Between 1990 and 2006, CO_2 emissions from the electric power sector have grown by about 29%, according to the report.[34] The most recent report shows energy-related carbon dioxide emissions grew by 1.6% in 2007.[35]

ETIC Tour of Colstrip Steam Electric Station, October 2007.
Photo courtesy of Lindsey Waggoner, outreach coordinator, Big Sky Carbon Sequestration Partnership.

The EPA also has published an Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006. Energy-related activities, primarily fossil fuel combustion, accounted for the majority of U.S. CO_2 emissions between 1990 and 2006. In 2006, about 83% of the energy consumed in the United States was produced through the combustion of fossil fuels.[36] "The process of generating electricity is the single largest source of emissions in the United States, representing 39 percent of [total CO_2] emissions from all sources across the country in 2005."[37]

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[32] *Montana GHG Inventory and Reference Case Projections 1990-2020*, Center for Climate Strategies, principal authors: Alison Bailie, Stephen Roe, Holly Lindquist, and Alison Jamison, September 2007, page 32.

[33] http://www.eia.doe.gov/environment.html

[34] http://www.eia.doe.gov/oiaf/1605/ggrpt/carbon.html

[35] http://www.eia.doe.gov/oiaf/1605/flash/flash.html

[36] *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006*, ES-12, Executive Summary, April 2008. http://www.epa.gov/climatechange/emissions/downloads/08_ES.pdf.

[37] http://www.epa.gov/climatechange/fq/emissions.html

In general, federal tracking of greenhouse gas emissions is based on a voluntary national registry. Power plants subject to the 1990 Clean Air Act acid rain program, however, must report certain emissions, including carbon dioxide, to the EPA. In Montana, those plants include: Rocky Mountain Power, PPL Corette, PPL Colstrip, Montana-Dakota Utilities Lewis and Clark Station, and Montana-Dakota Utilities Glendive Station. Based on the EPA Clean Air Markets reporting shown in **Table 1,** those plants emitted about 22.4 million tons of CO_2 in 2007.

Table 1

EPA Clean Air Markets: CO_2 Tons			
Facility	**2007**	**2006**	**2005**
Colstrip	19,382,297	18,240,485	19,219,042
Glendive	62,645	30,824	37,715
Hardin	950,823	3,293	(not in operation)
Corette	1,522,727	1,528,248	1,268,273
Lewis and Clark	501,257	503,041	441,038

Source: EPA: Clean Air Data and Markets. http://camddataandmaps.epa.gov

❑ Efforts to Report Emissions

Greenhouse gas emissions aren't currently regulated by the federal government. However, in 2007, the U.S. Supreme Court ruled that the EPA has failed to use its authority to regulate carbon in automobile exhaust as a pollutant. In the absence of federal laws on the subject of greenhouse gas emissions, states are forming individual and regional tracking and reductions programs.

Regional climate registries are developing across the nation. Montana is a member of the Western Climate Initiative that also includes Arizona, California, New Mexico, Oregon, Utah, and Washington. The Canadian provinces of British Columbia, Quebec, Ontario and Manitoba also joined. States will identify, evaluate, and implement ways to reduce greenhouse gas emissions. The initiative requires an overall regional goal to reduce emissions.[38]

[38] http://www.westernclimateinitiative.org/

The Regional Greenhouse Gas Initiative (RGGI) includes Connecticut, Delaware, Maine, Maryland, Massachusetts, Rhode Island, New Hampshire, New Jersey, New York, and Vermont. Starting in 2009, carbon emissions from power plants in those states will be capped at current levels—about 121 million metric tons annually. The cap remains until 2015 when the states then incrementally reduce emissions by 10% by 2019. It will be the first mandatory cap and trade program for emissions in the U.S.[39]

As of March 2008, 39 states, including Montana, joined the Climate Registry, a national initiative to track greenhouse gas emissions. The registry, a nonprofit organization, will be used to track, measure, verify, and publicly report greenhouse gases. State agencies, corporations, and educational institutions are invited to report emissions under the voluntary program. Some states also have mandatory reporting requirements. Nearly 30 states have completed or are in the process of completing climate change action plans.[40] Another 17 states have set statewide greenhouse gas emissions targets. A summary of climate change related activities in the region is included in **Appendix E**.

At the local level, the mayors of Billings, Missoula, and Bozeman signed on to the U.S. Mayors Climate Protection Agreement, committing to reduce emissions in their cities to 7% below 1990 levels by 2012.[41]

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[39] *Model Rule and Amended Memorandum of Understanding,* Regional Greenhouse Gas Initiative.

[40] "Climate Change 101: State Action", Pew Center on Global Climate Change, page 7. http://www.pewclimate.org/docUploads/101_States.pdf.

[41] www.usmayors.org/climateprotection/

Regulatory Efforts

There is a limited framework of existing legislation regarding carbon sequestration. However, many states are working through policy discussions that deal with regulatory frameworks related to CO_2 storage and sequestration. Washington state has one of the most comprehensive frameworks to date. A report prepared by the National Conference of State Legislatures outlining state activities related to sequestration is included in **Appendix F**. A supplement on activities in Wyoming, New Mexico, Washington, and Oklahoma also is included.

The IOGCC drafted a report titled "Carbon Capture and Storage: A Regulatory Framework for States", which includes a series of recommendations on a CO_2 framework. The report analyzes technical, policy, and regulatory issues related to storage of carbon dioxide in the subsurface, including oil and natural gas fields, saline formations, and coal beds. Efforts to draft the report were funded by the Department of Energy and the National Energy Technology Lab. The report analyzes regulatory frameworks for capture, transportation, injection, and postinjection storage.

"Establishment of a carbon capture and geological sequestration regulatory scheme in any particular jurisdiction will require an assessment for each component of the technical issues and a review of the existing regulatory framework."[42] The report resulted in model rules and statutes being adopted by the IOGCC in September 2007. An analysis of the IOGCC model statutes prepared at the request of the ETIC is included in **Appendix G**.

Storage of CO_2 raises the question of whether CO_2 captured, for example, at a power plant is considered a pollutant or a commodity and what agencies need to be involved in monitoring and regulation of the gas. In many states, including Montana, storage of natural gas, liquefied natural gas, and petroleum reserves is currently regulated with permitting, siting, and monitoring regulations in place. "Conceptually a societal decision has been made that the benefit of storage in terms of energy security and improved ability to meet demand outweighs the potential for negative impacts."[43] The benefits and

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[42] *Carbon Capture and Storage: A Regulatory Framework for States,* Interstate Oil and Gas Compact Commission, 2005, page 2.

[43] *Regulatory Barriers for Carbon Capture, Storage and Sequestration,* Sarah M. Forbes, National Energy Technology Laboratory, November 2002.

risks of such storage as it relates to CO_2 are being discussed in many forums. The underground storage of natural gas in Montana is outlined in Title 82, chapter 10, of the Montana Code Annotated.

Underground fluid injection is currently regulated through the EPA's UIC program. The program is part of the Safe Drinking Water Act established to protect underground water resources from contamination. Based on that system, there are five classes of wells for waste injection. Class II permits currently are issued for wells that are used for energy production, like EOR. The IOGCC report recommends that CO_2 injection wells be a subclass of Class II permits or be permitted under an entirely new federal classification. Pilot sequestration projects are currently regulated under Class V. As mentioned earlier in this report, the EPA has released draft rules discussing carbon sequestration. The draft rules would create a new class, Class VI permits, for geological carbon sequestration. It is unclear at this time if a state, like Montana, would be able to attain primacy over these new wells. A brief overview of the draft rules released by the EPA in July 2008 is included in **Appendix H**.

In Montana, the EPA enforces permitting for Classes I and III through V. The Montana Board of Oil and Gas Conservation enforces Class II. The state program is required to address environmental health and safety and to protect water from contamination by the injection or storage of natural gas.

Pipeline movement of CO_2 is currently regulated under Title 49 of the Code of Federal Regulations Part 195 (49 CFR 195) by the U.S. Department of Transportation Office of Pipeline Safety. Depending on location and size, a new pipeline proposed in Montana that is regulated under the Natural Gas Pipeline Safety Act of 1968 or the Hazardous Liquid Pipeline Safety Act of 1979 may need permitting through the DEQ, the Public Service Commission, and multiple other sources.

❑ Incentives

To date, 14 states have enacted or are in the process of enacting legislation with some form of financial incentive for "clean coal technologies".[44] Those incentives range from streamlined permitting in Colorado for certain technologies to tax credits for coal

[44] National Conference of State Legislatures, Quarterly Review of Energy Policy and Activities in the State Legislatures, March 2007.

gasification facilities in Kansas. Kentucky, for example, requires its state Public Service Commission to approve various long-term contracts by utilities when the projects are for synfuel plants that use coal. Wyoming offers a sales and use tax exemption for equipment purchased to develop coal gasification or liquefaction facilities.[45]

Several states have formed carbon sequestration advisory boards to provide guidelines and calculate the costs of offsetting emissions. In general, these advisory boards focus on terrestrial sequestration in agriculture and forestry ecosystems. Nebraska, Wyoming, and Idaho have advisory committees.[46] In 2002, Idaho created a carbon sequestration advisory committee. The Idaho Soil Conservation Commission provides leadership for the group, and a Carbon Sequestration Assessment Fund was developed.[47] The Wyoming Carbon Sequestration Advisory Committee was created through state legislation under the Wyoming Carbon Storage Law.[48]

Montana also has approved legislation that provides incentives for new technologies. A review of those incentives is included below.

❑ Advancing Research

Montana legislators have over the years created a variety of study and research organizations, many aimed at economic development or focused specifically on agricultural commodities.

The Board of Research and Commercialization Technology (MBRCT) is created in 2-15-1819, MCA. It is attached to the Department of Commerce. Each year the MBRCT collects applications and awards research grants. In 2007, the MBRCT awarded 23 grants totaling $3.2 million in funding. The purpose of the research and commercialization special revenue account in 90-3-1002 and 90-3-1003, MCA, is to:

> (a) provide a predictable and stable source of funding for research and commercialization projects conducted in the state that demonstrates to both private and public sources, including federal research granting

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[45] Wyoming State Statutes 39-15-105 (2006).

[46] *Carbon Sequestration Role in State and Local Actions,* Department of Energy/NETL, Melissa Chan and Sarah Forbes, January 2005, page 5.

[47] Idaho Law 22-5101 (2002).

[48] http://www.wyomingcarbon.org/

agencies, that Montana recognizes the important contributions that research and commercialization endeavors offer to the state's basic industries.

(b) expand and strengthen research efforts for the state's basic industries to increase their economic impact on the state's economy;

(c) expand research efforts into areas beyond the scope of the state's basic industries to diversify and strengthen the state's economic security through the creation of technology-based operations and long-term quality jobs; and

(d) pay costs of administering of this part pursuant to 90-3-1003. (90-3-1001, MCA)

The 2007 Legislature expanded opportunities for awarding such grants. If applications are received, at least 30% of the account funds approved for research and commercialization projects must be directed toward projects that enhance clean coal research and development or renewable resource research and development, based on the amended law.

In April 2008, Montana State University in Bozeman, which includes the Big Sky Carbon Sequestration Partnership, received about $157,000 from the MBRCT to assist in funding its geological sequestration efforts at the Kevin Dome in northcentral Montana.

The current definition of "universal system benefits programs" includes public programs for "research and development programs related to energy conservation and renewables", as well as "market transformation designed to encourage competitive markets for public purpose programs".

Past Legislatures also have worked in this area. In 1991, the Clean Coal Technology program was approved. House Bill No. 701 created a clean coal demonstration account in the coal tax trust fund. It put $5 million a year for 6 years into the fund, and when a company applied for a loan, the next Legislature made a decision whether or not to award the loan. The Department of Natural Resources and Conservation (DNRC) designated legitimate projects. Projects had to show "efficiency in electricity generation and reduced pollutant emissions compared to current coal burning methods". Loans were made to projects that showed matching funds on a 4:1 ratio. Loans could not be made for early stage planning or preliminary research.

The bill was directed toward a clean coal demonstration project proposed at the Corette Plant in Billings. The project was aimed at reducing emissions and integrating a coal

cleaning process. The $400 million project was to be paid primarily with a federal grant from the Department of Energy.

During a 1993 special session, the Legislature repealed the program. Elimination of the program was part of the DNRC's 10% budget reduction, which was mandated by the regular 1993 session. The project in Billings also did not receive federal funding, and the DNRC reported a lack of interest in the program.

❑ 2007 Montana Legislation

During the 2007 legislative session, members of the Montana Legislature were introduced to a multitude of greenhouse gas and climate change-related bills. Carbon and related greenhouse gases were the topic of a variety of bills considered during the session. **Appendix I** includes the list. A Montana Climate Change Caucus led by Rep. Mike Phillips also took shape. Rep. Sue Dickenson requested that the Legislative Council assign a study of climate change, House Joint Resolution No. 60, which would have coordinated efforts with the MCCAC. That resolution was tabled. Rep. Alan Olson introduced a study bill, House Bill No. 828, which outlined a study of carbon sequestration issues in Montana. That bill also died in the process.

Two bills were passed and approved that address the carbon issue—HB 25, approved during the regular 2007 session, and HB 3, approved during the 2007 special session.

The Electric Utility Industry Generation Reintegration Act (HB 25) includes a carbon sequestration component. Until the state or federal government adopts uniformly applicable standards, HB 25 prohibits the Public Service Commission from approving acquisitions or leases of facilities or equipment used to generate electricity that is primarily fueled by coal unless a minimum of 50% of the CO_2 produced by the facility is captured and sequestered. Natural gas plants also must include cost-effective carbon offsets. The bill applies only to electric generating units constructed after January 1, 2007. The Public Service Commission is responsible for rulemaking related to carbon dioxide as stipulated in HB 25. By March 31, 2008, the Public Service Commission was directed to adopt rules to implement the cost-effective carbon offsets required at new facilities fueled by natural or synthetic gas. Those rules are included in **Appendix J**.

HB 3, as it relates to topics covered in this report, provides tax incentives for energy generation facilities that emit less carbon than conventional technologies. Incentives

also are provided for equipment that sequesters carbon. Based on the legislation, numerous types of facilities constructed after May 2007, including integrated gasification combined cycle (IGCC) plants that sequester carbon dioxide and natural gas combined cycle plants that offset a portion of the carbon dioxide produced through carbon credit offsets, are eligible for tax abatements. The percentage of carbon dioxide to be sequestered must be based on technology that is "practically obtainable as determined" by the DEQ, but not less than 65%.

Eligible facilities will be assessed at 50% of their taxable value for a period not to exceed 19 years, which includes up to 4 years for construction and 15 years of operation. IGCC facilities that apply for an air quality permit after 2014 are not qualified. Coal-to-liquids plants and other gasification plants that sequester carbon are not subject to the deadline.

An IGCC facility would be considered class fourteen property and taxed at 3% of its market value, as opposed to 6% currently. New equipment at existing power plants used to capture and to prepare for the transport of carbon dioxide also is considered class fourteen property. HB 3 gives permanent property tax rate reductions from 12% to 3% of market value for new investments in carbon sequestration pipelines. Coal-to-liquids facilities with carbon sequestration also are taxed at 3% of market value.

Liability and Ownership Rights

❑ Liability and Oversight

The question of liability may be addressed differently, depending on whether stored carbon is considered a pollutant or a commodity. Potential responsible parties for carbon sequestration could include: storage site landowners, injectors, operators, transporters, generators, lenders, or contractors. In addressing the liability question, first party insurance, direct government regulation combined with insurance, payments out of the tax system, trust accounts, liability caps, or systems of guaranteed benefits could be considered. "The degree of stringency varies across our regulatory analogs from a fairly unregulated approach in natural gas to a more structured approach in hazardous waste."[49]

Because there are a number of unknowns about carbon sequestration and because carbon would be stored for long periods of time, transfer of liability to the public sector also has been discussed in some states. In Texas, the Railroad Commission, acting on behalf of the state, acquires title to carbon dioxide captured by clean coal projects, specifically the proposed FutureGen project. The transfer of title, however, does not relieve the owner of liability for the generation of carbon dioxide performed before the CO_2 is captured.

By limiting potential liabilities, some believe sequestration projects will be encouraged. Some state governments are examining options for accepting liability for a limited number of projects or for a limited time—for example, accepting liability for the first deep saline project or for the first 5 years of sequestration. With liability transferred to the state, some public entities are discussing a fund managed by the state based on a fee assessed per volume sequestered. Others are discussing options for CO_2 injectors to purchase insurance in the private market.

Liability for damages to property for oil and gas development in Montana is outlined in 82-10-505, MCA:

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[49] "Towards a Long-Term Liability Framework for Geologic Carbon Sequestration", M.A. de Figueiredo, D.M. Reiner, and H.J. Herzog, May 2003.

> The oil and gas developer or operator is responsible for all damages to real or personal property resulting from the lack of ordinary care by the oil and gas developer or operator. The oil and gas developer or operator is responsible for damages to real or personal property caused by drilling operations and production.

The Board of Oil and Gas Conservation also oversees the requirements that oil and gas developers in Montana must follow as outlined in 82-11-123, MCA. Developers are required to furnish a reasonable bond, and an oil and gas production damage mitigation account also exists and is used to assist in mitigation costs as determined by the Board. The account historically has been used as an agency match for grant applications for reclamation projects and as an emergency cleanup fund. The state assumes responsibility over time for orphaned wells. "The transportation, injection and storage of carbon dioxide has been commonplace in oil and gas production for decades, and the liability associated with operational impacts is managed today."[50]

In Montana, a "hazardous waste", as defined in 75-10-403, MCA, is a waste or combination of wastes that:

> because of its quantity, concentration, or physical, chemical, or infectious characteristics, may:
> (i) cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or
> (ii) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of or otherwise managed.

Hazardous waste injection wells are not regulated under the Montana hazardous waste program, but are subject to requirements under a federal hazardous waste program. Class I wells are monitored by the EPA and are considered technologically sophisticated wells "that inject large volumes of hazardous or non-hazardous wastes into deep, isolated rock formations that are separated from the lower most [Underground Safe Drinking Water] by layers of impermeable clay and rock".[51]

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[50] Ibid.

[51] http://www.gwpc.org/e-library/e-library_documents/e-library_documents_general/classi.htm

The EPA has used the Class V experimental technology well permits for pilot CO_2 sequestration projects. "This guidance and the Class V experimental technology well permits will bridge the gap between pilot and commercial-scale projects. . . . On the basis of the data collected, the Agency may consider developing regulations tailored specifically for CO_2 injection."[52] As noted earlier in this report, the EPA in October 2007 announced its intentions to develop rules governing injection controls for carbon dioxide and in July 2008 released new, draft rules.

In Montana, water quality standards also merit review in relation to sequestration. The Montana water quality laws in Title 75, chapter 5, MCA, provide guidance for the "prevention, abatement, and control of water pollution". The Board of Environmental Review is assigned the responsibility of establishing criteria to determine whether activities, or a class of activities, result in nonsignificant changes in water quality. Nonsignificant activities are enumerated in 75-5-317, MCA. It also is notable that in Montana, beyond stated exemptions, it is unlawful to construct, modify, or operate a disposal system that discharges into any state waters without a DEQ permit. "State waters" include surface and ground water.

❑ Surface and Subsurface Rights

Property with underground pore space and the potential injection of CO_2 into that pore space raises several legal questions related to ownership. Mineral owners, surface owners, lessees of minerals, and the owners of production are all part of the potential equation. The IOGCC looked at three models for guidance: injection of CO_2 for EOR, natural gas storage in geological formations, and injection of acid gas into geological formations. The task force concluded that the law recognizes an ownership interest in subsurface pore space.

ETIC staff attorney Todd Everts prepared a legal opinion on the topic of surface and subsurface rights in Montana to assist ETIC members in a discussion about ownership issues. That opinion is included in **Appendix K**. The ETIC also discussed this issue indepth in its review of LC4002, although it did not pursue the draft.

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[52] "Using the Class V Experimental Technology Well Classification for Pilot Geologic Sequestration Projects", UIC Program Guidance (UICPG # 83), EPA, March 2007, page 3.

Economics

❑ Costs

The costs of carbon capture and sequestration are uncertain and may be determined in part by successful commercial demonstrations of carbon capture and storage, by carbon market prices, and by state and federal decisions regulating carbon emissions. "Successful implementation of CCS will inevitably add cost for coal combustion and conversion", according to MIT's "Future of Coal" report. In that report, researchers examined both a high-price trajectory and a low-price trajectory. In the high-price scenario, researchers looked at $25 a ton for CO_2 in 2015 with increases of 4% a year thereafter. At $25 a ton, capture and storage technology approaches a level that makes it more economically feasible.[53] In the low-price scenario, researchers used $7 a ton for CO_2 in 2010, with a 5% increase thereafter. Using the low-price scenario, carbon capture and sequestration becomes more economical about 25 years later than under the high-price scenario, according to the report. Carbon markets in the U.S. over the last few years have put the price of 100 metric tons of CO_2 equivalent between $3 and $10 a ton. In June 2008 carbon was at a price of about $5.45 a ton. Much discussion about pricing continues. Chevron, for example, considers the MIT prices to be extremely optimistic, specifically the capture costs.

Based on information included in **Table 2**, capture increases the cost of electricity production (not the price of electricity paid by customers) by 35%-70% for a natural gas combined cycle plant, 40%-85% for a supercritical pulverized coal plant, and 20%-55% for an IGCC plant. "The costs of retrofitting existing power plants with CO_2 capture have not been extensively studied."[54] The feasibility and costs of capture are site specific and depend on the size, age, and efficiency of a plant, availability of space for capture and compression equipment, and type of fuel burned.

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[53] *The Future of Coal: Options for a Carbon-Constrained World,* An Interdisciplinary MIT Study, 2007, Executive Summary, page XI.

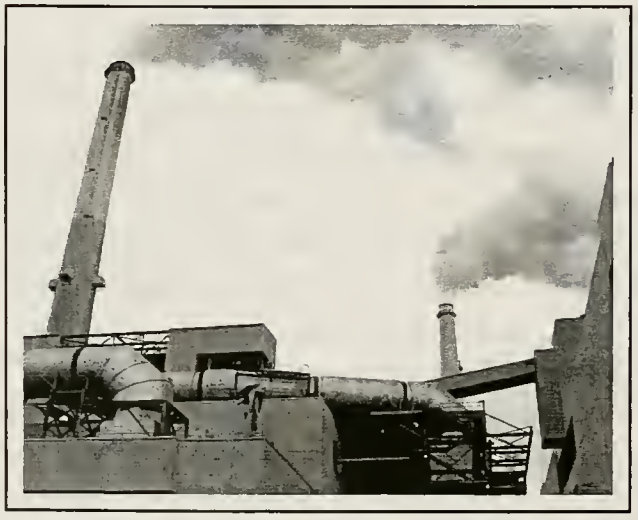
[54] "Carbon Dioxide Capture and Storage: Summary for policymakers and technical summary", Intergovernmental Panel on Climate Change, Executive Summary.

Table 2

Economic Issues			
Power Plant System	Natural Gas Combine Cycle (US$/kWh)	Pulverized Coal (US$/kWh)	Integrated Gasification Combined Cycle (US$/kWh)
Without capture (reference plant)	0.03-0.05	0.04-0.05	0.04-0.06
With capture and geological storage	0.04-0.08	0.06-0.10	0.05-0.09
With capture and enhanced oil recovery	0.04-0.07	0.05-0.08	0.04-0.07

Source: Intergovernmental Panel on Climate Change,
http://www.mnp.nl/ipcc/pages_media/SRCCS-final/ccsspm.pdf

PPL Montana, which is an operator at the Colstrip Steam Electric Station, noted in its presentations before the ETIC in 2007 that it believes that the energy penalty for carbon capture at a coal fired power plant could be as high as 30%. The company has some preliminary estimates of the costs of retrofitting Colstrip for carbon capture. Company officials, however, stress that the information is preliminary and does not indicate any specific plan of action. As background, Colstrip has an O&M budget of about $97.6 million, with capital at about $52.6 million. Technology reviewed by PPL assumes 90% capture with carbon at $4 a ton. It has looked at three options for retrofitting as outlined in **Table 3**. Chevron notes that the costs for the chilled ammonia process remain uncertain.



ETIC Tour of Colstrip Steam Electric Station, October 2007.
Photo courtesy of Lindsey Waggoner, outreach coordinator, Big Sky Carbon Sequestration Partnership.

Table 3

PPL Montana Estimates for Carbon Capture			
Technology	**Capital Cost**	**O&M**	**CO_2 Removal Cost Per Ton**
Amine Scrubber Process	$430 million	$900 million (includes a 30% energy penalty or about 625 MW of energy being used for the capture process)	$53
Chilled Ammonia Process (capture carbon in flue gas)	$430 million	$650 million (includes a 9% energy penalty or about 189 MW of energy being used for the capture process)	$39
Biological Capture Process (use of algae and photosynthesis) This assumes 40% capture as opposed to 90% and includes an infrastructure with about 26 square miles of algae.	$1.7 billion	$417 million (revenue = $750 million based on biodiesel)	Revenue per ton = $95

Source: PPL Montana

The costs associated with compressing and transporting carbon also must be considered. Pipeline costs are another consideration. The Wyoming Pipeline Authority has examined potential numbers for a CO_2 pipeline infrastructure. Some CO_2 pipelines are already operating in Wyoming, and the Authority looked at a CO_2 grid with about 480 miles of new line. In the Wyoming analysis, the Authority reviewed a 10-to 30-year initial contract life, a fixed monthly fee based on units of contract capacity that is paid whether capacity is used or not, and usage fees. It has examined those costs in terms of the varying contract lengths. A CO_2 pipeline could cost as much as $52,000 to $57,000 per inch mile, with the compression borne by the suppliers. The Wyoming analysis relies on a debt/equity ratio of 70/30 and debt at 7%.[55] With the expected high

[55] Presentation by Brian Jeffries, executive director Wyoming Pipeline Authority, Big Sky Carbon Sequestration Partnership Annual Forum, August 23, 2007, Bozeman, Mont.

costs of infrastructure, the credit worthiness of shippers is critical, according to the analysis.

The Pipeline Authority also notes the differences between CO_2 expansions and natural gas expansions. Jurisdiction for CO_2 pipelines is in question. There is no existing grid, accepted rate design, market depth, standard contract, or forward market, and there is uncertainty about creditworthy supporters. Questions about funding for such an expansion also are noteworthy. Sources that have been discussed include states, the federal government, EOR producer coalitions, utility buyers of generation output, and CO_2 producers, according to the Authority. A more indepth review of pipeline costs is included in **Table 4**.

Table 4

Rate Matrix — 540,000 Mcf/d System			
Contract term (yrs)	Levelized rate per Mcf of capacity	Annual fixed fees on a 50,000 Mcf/d contract	Life of contract fixed fees on a 50,000 Mcf/d contract
10	$0.44	$8 MM	$80 MM
15	$0.37	$6.8 MM	$101 MM
20	$0.34	$6.2 MM	$124 MM
30	$0.31	$5.7 MM	$172 MM

Source: Wyoming Pipeline Authority

To date, a lot more work in analyzing the costs of terrestrial sequestration has been completed. For now, economic analysis related to geological sequestration is focused on sequestration for EOR and sequestration in deep saline aquifers. Research in this area is ongoing.

❑ Risks

Carbon dioxide is a natural part of the atmosphere; however, large concentrations can be a direct risk to humans. In the spring of 2006, three ski patrol members suffocated on Mammoth Mountain in California afer being overcome by toxic fumes. Carbon dioxide and other gases naturally vent from volcanic fissures on the mountain, and the patrol members fell into a snow cave and died from a lack of oxygen, which was

displaced by carbon dioxide.[56] In 1986, residents of a village in the African nation of Cameroon were killed when the water in a volcanic lake overturned and released a massive amount of carbon dioxide.

Other risks to humans include the potential for potable aquifer contamination and the possible risk of induced seismicity because of movement of displaced fluids. When CO_2 is injected, it can react with saltwater in underground formations and make them more acidic. That water can dissolve minerals, like heavy metals, which can migrate with the water through the underground storage area. "Scientists currently use monitoring to track the migration of plumes in groundwater. Sequestration sites will be selected because they are isolated from ground water by layers of dense rock."[57] Some scientists believe that dissolved carbon dioxide plumes would not seep into ground water and that monitoring could show plume migration. Pumping could be used to prevent contamination if a plume was nearing ground water, according to some researchers.

Other mitigation strategies also are possible, and a risk assessment would likely identify potential risks and mitigation plans for dealing with such risks. Seismic activity is being reviewed at test sites in the U.S. Injection wells are currently regulated through the UIC program, which requires site characterization, testing, and monitoring. "More research is recommended on developing site selection criteria and operational constraints for CO_2 storage sites near zones of seismic concerns."[58]

Environmental risks include concern about the re-release of carbon dioxide, ultimately undoing the benefits of sequestration. There is no guarantee that sequestered carbon won't leak. "However, in the petroleum producing areas of the United States, oil and gas deposits, as well as naturally occurring carbon dioxide gas, have been trapped underground for millions of years."[59] This issue also would depend on the size of a re-release, noting the overall net reduction in emissions realized by a sequestration project. Some in the scientific community also raise concerns about sequestration

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[56] "Three die from toxic gases at California ski resort", by Sonya Geis, *Washington Post*, April 8, 2006.

[57] http://www.bigskyco2.org/FAQs-geologic.htm#PHHE

[58] "Issues Related to Seismic Activity Induced by the Injection of CO2 in Deep Saline Aquifers", J. Sminchak and N. Gupta, Batelle Memorial Institute, and C. Byrer and P. Bergman, National Energy Technology Laboratory.

[59] http://www.bigskyco2.org/FAQs-geologic.htm#EISCDR

encouraging a continued reliance on fossil fuels, environmental issues associated with pipeline expansion, and impacts to biological communities that live deep underground.[60]

There also are risks associated with terrestrial carbon sequestration. There are no national standards for establishing baselines, so baseline calculations could change over time. Baseline estimates are needed to calculate the carbon reductions accomplished by a project. Monitoring risk is another issue, depending on how liability is assigned. "For example, utilities that purchase carbon credits from farmers may be held liable if farmers fail to follow through with promised emission reduction activities."[61] Reduced investment profitability because of changing economic factors, like changing output prices and interest rates, also may be considered financial risks.

❑ Benefits

It is challenging to categorize the benefits of carbon sequestration. They range from reducing greenhouse gas emissions to providing new markets for the agriculture industry. The National Energy and Technology Laboratory notes that sequestration works toward implementation of national energy policy goals to develop new technologies and supports international collaborations to reduce greenhouse gas emissions and intensity.

Sequestration can provide potential economic benefits in oil and gas fields via enhanced oil recovery. Some studies are also reviewing the ability of carbon sequestration to enhance coal bed methane production. In terms of terrestrial sequestration, it is difficult to separate the benefits of carbon sequestration from other environmental benefits of a certain land use practice. For example, the introduction of cover crops or the conversion to conservation tillage from conventional tillage also reduces soil erosion, in addition to sequestering carbon.

The Public Interest Energy Research Program Research Development and Demonstration Plan prepared a report for the California Energy Commission, which

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[60] "Policy Context of Geological Carbon Sequestration", Union of Concerned Scientists: Citizens and Scientists for Environmental Solutions, page 4.

[61] "Setting Up a Tradable Carbon Offsets System: Risk, Uncertainty and Caveats", Department of Agriculture and Applied Economics, College of Agriculture and Life Sciences, Virginia Polytechnic Institute and State University.

includes a discussion of the co-benefits of carbon sequestration. That report is included in **Table 5**.

Table 5:

Co-Benefits of Carbon Sequestration	
Environmental	**Economic/Productivity/Energy**
Improved salmonid and wildlife habitat	Enhanced oil, gas, methane recovery
Improved soil and water quality	Increased plant and crop productivity
Reduction in soil erosion and runoff	More biomass products
Decreased nutrient loss	Development of exportable technologies
Decreased water and pesticide use	Reduced dependence on oil imports
Restored degraded ecosystems	Decreased energy use through bioenergy, i.e., trees can lower reflectivity and cooler temperatures
Increased biodiversity	Rural economic growth
Increased water conservation	
More sustainable land use and food production	
Reduction in concentrations of GHGs, including methane and nitrous oxide	

Sources: Pew 2001, USDOE 1999, USDA 1998

rule development process, states may be able to minimize the need to revise state UIC program requirements.

As my office develops the proposal, we are coordinating with the Office of Air and Radiation, EPA's lead office on climate change. We also recognize states play a vital role in protecting drinking water sources, and have included states on the workgroup developing the proposal. We will continue to collaborate with states through the Ground Water Protection Council and the Interstate Oil and Gas Compact Commission on UIC program issues. We will also work with states to develop guidance on the primacy application and approval process for GS wells.

Thank you for your continued cooperation and for your support in protecting our America's water supplies, above and below ground. If you have questions or concerns related to EPA's proposed rulemaking on the GS of CO_2 please contact Stephen Heare, Director, Drinking Water Protection Division, at (202) 564-3751.

Sincerely,

Benjamin H. Grumbles
Assistant Administrator

Carbon Sequestration Work Plan Tasks

_X_ 1. Study the feasibility of geological and terrestrial carbon sequestration in Montana and the characteristics of areas of the state where carbon could be sequestered.

Who: Representatives of the Big Sky Carbon Sequestration Partnership; Representatives of the NextGen Energy Council; Gordon Criswell, environmental manager for Colstrip Steam Electric Station; Tom Richmond, division administrator for the Montana Board of Oil and Gas; Bonnie Lovelace, Department of Environmental Quality water protection bureau chief; Paul Suket, vice president and deputy general manager for Basin Electric and Basin Cooperative Services; and Ted Dodge, Project Broker, of the National Carbon Offset Coalition.
Time line: Oct. 2007, Nov. 2007, May 2008 meetings

_X_ 2. Examine the methods and technologies for the geological and terrestrial sequestration of carbon.

Who: Representatives of the Big Sky Carbon Sequestration Partnership; Representatives of the NextGen Energy Council; Gordon Criswell, environmental manager for Colstrip Steam Electric Station; Tom Richmond, division administrator for the Montana Board of Oil and Gas; Bonnie Lovelace, Department of Environmental Quality water protection bureau chief; Paul Suket, vice president and deputy general manager for Basin Electric and Basin Cooperative Services; and Ted Dodge, Project Broker, of the National Carbon Offset Coalition; and ETIC staff.
Time line: Oct. 2007, Nov. 2007, and May 2008 meetings

_X_ 3. Review the findings and recommendations of the Montana Climate Change Advisory Committee related to carbon sequestration.

Who: DEQ Director Richard Opper; Energy and Pollution Prevention Bureau Chief Lou Moore; and ETIC and EQC staff.
Time line: Nov. 2007, May 2008, and July 2008 meetings

_X_ 4. Inventory of sources and volumes of carbon produced in Montana.

Who: ETIC staff
Time line: November 2007 meeting

_X_ 5. Review existing state and federal regulations governing carbon sequestration.

Who: Bonnie Lovelace, DEQ; Tom Richmond, BOG; NCSL staff; ETIC staff.
Time line: Jan. 2008 and May 2008 meetings

_X_ 6. Review liability issues related to sequestration and legal issues related to surface vs. subsurface, ownership issues.

Who: Northern Plains Resource Council; Representatives of the NextGen Energy Council; and ETIC staff.
Time line: Oct. 2007, Nov. 2007, May 2008 meetings

_X_ 7. Review costs and benefits of carbon sequestration.

Who: Representatives of the NextGen Energy Council; Gordon Criswell, environmental manager for Colstrip Steam Electric Station; representatives of the Big Sky Carbon Sequestration Partnership; Dave Ryan, energy engineer, National Center for Appropriate Technology; Steven Aumeier, Director Energy Systems and Technologies Division, Idaho National Laboratory; Ben Brouwer, AERO; and ETIC staff reports.
Time line: Oct. 2007, Nov. 2007, Jan. 2008 and May 2008 meetings

Unofficial Draft Copy
As of: May 27, 2008 (10:52am)

**** Bill No. ****

Introduced By **********

By Request of the *********

A Bill for an Act entitled: "An Act specifying ownership of pore space in strata underlying surfaces; affirming the dominance of the mineral estate; providing for a description of a pore space prior to a transfer; requiring the description to be filed with a county clerk; and providing an effective date."

Be it enacted by the Legislature of the State of Montana:

NEW SECTION. **Section 1. Short title.** [Sections 1 through 6] may be cited as the "Pore Space Ownership Act."

NEW SECTION. **Section 2. Purpose.** The purpose of [sections 1 through 6] is to provide for the protection and compensation of surface owners of land underlaid with pore space that may be used for the storage of carbon dioxide or other substances and to affirm the dominance of mineral estates while allowing for the necessary development of pore space.

NEW SECTION. **Section 3. Definitions.** As used in [sections 1 through 6] the following definitions apply:

(1) "Pore space" is defined to mean subsurface space of any size and whether vacant or filled that can be used as storage space for carbon dioxide, compressed air, or other substances

injected into the space for storage. It does not include a natural gas storage reservoir.

(2)"Surface owner" means the person who holds record title to or has a purchaser's interest in the surface of the land.

NEW SECTION. **Section 4. Ownership of pore space.** The ownership of all pore space in all strata below the surface of this state is vested in the owner of the surface above the strata.

(2) A conveyance of the surface ownership of real property is a conveyance of the pore space in all strata below the surface of that real property, unless the ownership interest in that pore space previously has been severed from the surface ownership or is explicitly excluded in the conveyance.

(3) It is the property owner's right as established by 70-16-101 to convey pore space. An agreement conveying mineral or other interests underlying the surface may not convey ownership of any pore space in the stratum unless the agreement explicitly conveys that ownership interest.

(4) [Sections 1 through 6] do not alter, amend, diminish or invalidate rights to the storage use of subsurface pore space acquired by contract or lease prior to [the effective date of this act].

(5) [Sections 1 through 6] do not affect the respective liabilities of any party.

NEW SECTION. **Section 5. Dominance of mineral estate.** (1)

[Sections 1 through 6] may not be construed to change or alter common law in accordance with 1-1-108, as it relates to the rights belonging to, or the dominance of, the mineral estate, including but not limited to the right to mine, drill or recomplete a well, inject substances to facilitate production, or an enhanced recovery project as defined in 82-11-101 for the purposes of recovery of oil, gas or other minerals.

(2) If it is determined that an underground reservoir, natural or manmade, is depleted of oil or gas or abandoned by the mineral owner, it may be considered pore space in accordance with the provisions of [sections 1 through 6].

(3) All instruments transferring the rights to pore space under [sections 1 through 6] must describe the scope of any right to use the surface estate. The owner of any pore space right may not use the surface estate beyond the conditions established in a properly recorded instrument.

NEW SECTION. **Section 6. Pore space description and requirements for transfer.** (1) Transfers of pore space rights made after [the effective date of this act] are void at the option of the owner of the surface estate if the transfer instrument does not contain a specific description of the location of the pore space being transferred.

(2) The description must include but is not limited to:

(a) a detailed description of the subsurface stratum or strata involved in the transfer;

(b) a legal description of the boundaries of the surface

lying over the transferred pore space; and

(c) a list of the existing lessees, rights, or interests on the property, including mineral interests and any other rights attached to the surface lying over the transferred pore space.

(3) The description required in this section must be reviewed by the county surveyor and a copy must be transmitted to and filed with the clerk of the county or counties where the transferred pore space is located.

NEW SECTION. **Section 7. {standard} Codification instruction.** (1) [Sections 1 through 6] are intended to be codified as an integral part of Title 70, and the provisions of Title 70 apply to [sections 1 through 6].

NEW SECTION. **Section 8. {standard} Effective date.** [This act] is effective July 1, 2009.

- END -

{Name : Sonja E. Lee
Title : Research Analyst
Agency: LSD LEPO
Phone : 406-444-3078
E-Mail: sonjalee@mt.gov}

OverSight Resources, LLC

1087 Stoneridge Drive, Ste. 2E
Bozeman, MT 59718

July 7, 2008

Honorable Harry Klock
Chairman, Energy and Telecommunications Interim Committee
P. O. Box 201706
Helena, MT 59620-1706

Dear Chairman Klock and Members of the Committee,

Oversight Resources is pleased to be able to offer the following comments regarding draft legislative proposals LC 4002 and 4003 that will be considered by your committee July 16th. Oversight Resources is a small, privately held, start up company located in Bozeman, Montana. Oversight Resources is interested and involved in an array of energy related activities including wind and oil/gas development. Carbon capture has unique opportunities for companies such as ours and we have been following your progress.

LC 4002 proposes to ensure that pore space under a person's private property is also owned by the surface owner. Oversight Resources opposes LC 4002 until such time as other issues involved in carbon capture and storage are resolved, particularly the liability issue. There is no doubt that pore space is owned by the surface property owner, but by creating a separate new property estate without resolving other issues related to carbon storage could have many unintended consequences that actually make energy development more difficult. No work has been done to clarify liability issues that surround carbon storage, nor has the EPA decided how to classify CO2 and regulate how CO2 fits with current underground injection regulatory frameworks. Frankly, individual states taking action prior to the Federal Government may hinder energy development on public and private lands.

If this committee is intent on passing some legislation regulating carbon capture we suggest a thorough and comprehensive study using information from a wide variety of sources. Oversight Resources supports including pore space ownership to the areas that you are intending to study in LC 4003.

Thank you for the opportunity to comment on these issues.

Sincerely,

Bryan F. Rogan
OverSight Resources, LLC
1087 Stoneridge Drive, Suite 2E
Bozeman, MT 59718
Tel: 406-586-8440
roags@msn.com

Nowakowski, Sonja

From: Blattie, Harold
Sent: Thursday, July 03, 2008 5:04 PM
To: Nowakowski, Sonja
Subject: ETIC Bill Draft LC 4002 Comments

Sonja,

I will not be able to attend the ETIC meeting but would like to submit comments on LC 4002 and specifically Section 6 of the bill draft.

Thank you,

Harold

Members of the Energy and Telecommunications Interim Committee:

RE: LC 4002

I am going to focus only on the use of the term "the county surveyor" and the word "file" in Section 6, subsection 3.

My experience with the term "the county surveyor" in §76-2-102, MCA, (zoning law) is that it causes nothing but problems because many counties no longer have "county surveyors." Some counties have eliminated the position; other counties have incorporated any surveyor function into the department of public works and I suspect those offices do not have "the county surveyor."

Subsection (3) of Section 6 of LC4002 imposes a duty on an often non-existent person. Many of our eastern counties don't even have an examining land surveyor, let alone a county surveyor.

I can envision nothing but problems in the offices of clerk and recorders when they are presented with a description per Section 6, subsection (2), if they even know what "pore space" is. I suspect the clerks will be unable to evaluate the information required by subsection (2), and in most cases will not have a "county surveyor" to turn to. Even if there is a surveyor in private practice in a county, I suspect those surveyors would not be able to determine whether the description is accurate.

Most important, from a liability standpoint, I am concerned that the proposed bill transfers the liability for an inadequate description under subsection (2) to the county, because subsection (3) requires a review by "the county surveyor" which some will argue imposes a legal duty on the county to ascertain the accuracy of the section (2) description. I fear landowners or Realtors will try to satisfy subsection (2) on their own, then leave it up to the county to determine whether they did it correctly.

As to the use of the word "file" imposing the requirement that the documents be "filed", I believe the more appropriate term would be "record (ed). I have requested that the county clerks provide you with information about how filed and recorded documents are handled and will assume they have done so.

Thank you,

Harold Blattie, Executive Director of the Montana Association of Counties

Nowakowski, Sonja

From: Raney, Bob
Sent: Tuesday, June 10, 2008 2:29 PM
To: Nowakowski, Sonja
Cc: Jergeson, Greg; Toole, Ken; Wiseman, Rep. Brady
Subject: RE: ETIC carbon sequestration draft report

Hi Sonja,

I have a few comments in repl;y to your request..

On the carbon capture study - a whole lot is being shuffled under the table that is so important for progress in the area of Geological storage of CO2. To not include it in the study is to put off for two more years our opportunities. First, the study misses a very, very important point - where to put the CO2. If the ideas is to get a modern carbon capture coal plant built in Montana, then the most important question to answer is WHERE. The study should include maps and references to where conditions exist to explore further the most economical and environmentally proper places in Montana to do it - where are the geological possiblilities, where are the best transmsion line and pipe line routes, where will the load go, is is EOR the first choice or only choice and etc. This limited study appears to be a (let's not do much" compromise by ETIC to do next to nothing to advance Montana as a Carbon sink or help us prepare for our own domestic Montana needs.

.$25,000 won't lift the study off the ground. There are serious costs (economic, social and environmental) associated with CO2 sequestration. The committee should seriously expand the size, scope and money for this study. The Saudi Arabia of coal ought to move forward like they intend to use coal in the modern carbon constrained environment. The ETIC work plan called for much more along this line:

Based on the work plan adopted by the ETIC in 2007, members reviewed seven specific issues:

1. Feasibility of geological and terrestrial carbon sequestration in Montana and the

characteristics of areas of the state where carbon could be sequestered.

Big Sky Carbon Sequestration Partnership will locate geological formations. but someone has to do the actual site drilling and exploration and locate the places that make the most economic and environmental sense. And then convince an entrepeneur that we have the right place to invest $4 or $5 billion.
As an example, a working group sponsored by the PSC is seeking a $400,000 grant just to have UM Butte Tech study particular geological sites (that make both econ and enviro sense) to hold compressed air for compressed air storage generation facilities - because we want one or more built here in Montana.

Thanks for listening

Bob Raney
MT PSC Commissioner

Nowakowski, Sonja

From: Robert Solum [robert_solum@yahoo.com]
Sent: Tuesday, June 10, 2008 5:17 PM
To: Nowakowski, Sonja
Subject: carbon sequestration study

Sonja,

I don't see the need to go forward with programs like this until it has been determined that we even have a problem. I have repeatedly asked for the science that has convinced you that man is responsible for catastrophic global warming. No one including you or your organization or your collegues have been able to produce appropriate science to settle the matter.

If it can't be shown scientifically that we have a problem why on earth would we propose solutions? This is so elementary it takes my breath away that we are even discussing it.

Robert E. Solum

Nowakowski, Sonja

From: Lovelace, Bonnie
Sent: Tuesday, June 17, 2008 1:50 PM
To: Nowakowski, Sonja
Subject: Comments/edits on carbon sequestration report

Sonja: I assume you would like another set of eyes on this one. I have a few small comments.
Page 4 Costs and benefits of carbon sequestration, Finding 2--could you add to risks to humans (and animals!) leakage to the surface? I know you discuss it later, but it could fit here

Page 25, Table 2: column 1, second choice--do you mean With capture and geological storage, not Without

Page 27 (and this is really small) Risks--three ski patrol members--plural not singular

Nice report.

Bonnie Lovelace

Nowakowski, Sonja

From: Fred Bonnett [bb926@hotmail.com]
Sent: Tuesday, July 08, 2008 7:32 AM
To: Nowakowski, Sonja
Subject: Oxygen and the Carbon Sequestration Study

Dear Sirs:

The sequestration of one pound of carbon in the form of CO2 will remove 2.7 pounds of oxygen from the atmosphere. Carried out on a large scale such procedures will effect the total amount available free oxygen in the atmosphere. The consequences of such an O2 reduction, while far from fully understood, will certainly effect plant growth and rates of organic decay.

Full studying of all the consequences of CO2 sequestration is essential.

Sincerely,

Fred Bonnett
2950 Rockrim Ln.
Billings, MT 59102

June 30, 2008

Ms. Sonja Nowakowski
Legislative Environmental Policy Office
P.O. Box 201704
Helena, MT 59620-1704

RE: Carbon Sequestration Study: An Analysis of Geological and Terrestrial Carbon Sequestration Regulatory and Policy Issues – public comment

Dear Ms. Nowakowski:

The Montana Logging Association (MLA) offers the following comments on the above referenced study. The MLA represents approximately 600 independent logging contractors, each of which operate a family-owned enterprise that harvests and/or transports timber from forest to mill. In Montana, the vast majority of timberland is owned by government agencies; therefore the welfare of the MLA members is directly dependent upon the policies and actions of state and federal land managers.

As you know, forests cover more than one third of the world's area and constitute the major terrestrial carbon pool. Trees and other forest plants fix carbon dioxide through photosynthesis. All forest organisms release carbon dioxide through respiration and at the time of wildfire; therefore, forests are both sinks and sources for atmospheric carbon dioxide.

In the United State in 2004, forests sequestered 10.6% of the carbon dioxide released in the U.S. by the combustion of fossil fuels (coal, oil and natural gas). Urban forests sequestered another 1.5%. To further reduce U.S. carbon dioxide emissions by 7%, as stipulated in the Kyoto Protocol, would require the planting of "an area the size of Texas every 30 years", according to William H. Schlesinger, dean of the Nicholas School of the Environment and Earth Sciences at Duke University.

Increasing the biomass or carbon content of existing forests through forest management and fixing the carbon content through the manufacturing of wood products are the only viable options for enhancing sequestration of atmospheric carbon dioxide.

In order to determine the role of forests in mitigating atmospheric carbon dioxide content, it is essential to have an accurate inventory of the carbon content in forests and therefore we support active studies that collect accurate data for analysis.

The COLE 1605(b) Report for Montana - an on-line carbon estimating program sponsored by the US Forest Service Inventory and Analysis and the National Council for Air and Stream Improvement - reports forest carbon in metric tones per hectare by forest type in Montana. The report shows that there are approximately 2.84 million acres of ponderosa pine and 6.17 million acres of Douglas-fir in Montana. These two forest types combined sequester approximately 254 million tons of carbon in live trees.

In addition, recent studies comparing carbon sequestration in managed forests to un-managed forests shows a 3% increase the first year after harvest in ponderosa pine stands and a 4% increase in Douglas-fir stands compared to .5% and .8% respectively in un-managed stands.

Forest management not only plays a critical roll in sequestering atmospheric carbon dioxide, managing for a healthy ecosystem aids wildfire suppression and severity. Wildfires consume 5 – 10 million acres releasing approximately 10 tons of carbon dioxide annually. Ninety percent of the carbon released during a wildfire occurs within the first 14 hour pulse. Recent studies indicate that more carbon is sequestered in the medium-age forest types from 80 – 141 years. Old growth forests no longer sequester carbon they become a net storehouse and actually decrease carbon storage by a percentage point of 0.02 to 0.03 depending upon tree species. The amount of carbon released in a wildfire depends on the total biomass of the forest burned and how thoroughly the biomass is consumed. Biomass in a typical forest in Montana may

measure 1,000 kg to the hectare. Applying the more general carbon concentration of 50%, each hectare burned would release about 500kg of carbon into the atmosphere just from fires in Montana. It would take anywhere from 40 to 200 years – depending on species and age class – to recapture the released carbon from the atmosphere, assuming the same forest would not burn again in that time frame.

As you can see, forests play a critical roll in addressing climate change and green house gas emissions. Therefore, we believe it is important to not only manage Montana's pristine landscapes for forest health, wood fiber utilization, carbon sequestration and wildfire mitigation; but that Montana's unique interests are protected and enhanced as state and national policies are developed.

Thank you for this opportunity to comment. Feel free to contact me if you have questions at the Montana Logging Association Missoula field office at (406) 251-1415 or (406) 253-4485.

Sincerely,

Julia Altemus
Resource Specialist

MONTANA
Wood Products
ASSOCIATION

July 9, 2008

Energy and Telecommunications Interim Committee
Legislative Services Division
P. O. Box 201706
Helena, MT 59620

Attention: Sonja Nowakowski

Thank you for the opportunity to provide a few brief comments regarding the draft Carbon Sequestration Study. The comments are presented on behalf of the 15 member companies of the Montana Wood Products Association. All of our members are involved in the manufacture of wood products with the raw material coming mostly from private and public Montana forest lands.

While very little in the report is directed at forestry and terrestrial sequestration there are a few points I would like to make regarding trees and their ability to sequester carbon. Forests take up atmospheric carbon dioxide and store it for decades in live and dead trees, soils, and harvested wood products through the process of photosynthesis. Therefore, forest land is known as a carbon sink. The caveat is that the trees do their best job when young, green, and healthy or when harvested and made into a product.

Unfortunately for Montana many of our treed acres are in extremely unhealthy condition – ripe for wildfires. In 2007 Montana lost approximately 800,000 acres of forest land to wildfire and pumped millions of tons of CO2 into the air. Our air quality was severely affected with health alerts issued daily for weeks in various parts of the State. The trees that were salvaged following the fires and manufactured into products are again sequestering carbon. Sadly, hundreds of thousands of acres of burned trees remain on the landscape. The planting of seedlings for replacement of the burned trees would be the best case scenario because again young, green trees are the best at sequestering carbon.

The study is a bit sketchy in the cap and trade arena as it relates to forestry which is no surprise. Much has been made about carbon credits from forestry and the selling of the same to offset other sources of greenhouse gas but the jury appears to still be out with the majority of these

P.O. Box 1149, Helena, MT 59624 Phone (406) 443-1566 Fax (406) 443-2439 www.montanaforests.com

efforts. As the study points out, there are no national standards for establishing baselines related to terrestrial carbon sequestration and standards are needed to calculate the carbon reductions produced by a project. One scientific fact, however, is that live trees and wood products do have a positive impact on carbon dioxide in the atmosphere.

Research into the value of live trees and wood products for sequestering carbon is continuing in many venues. There are a number of arguments underway regarding just how much carbon trees do sequester and there is currently no definitive answer. There are many species, ages, sizes, and conditions of Montana's forests, so probably no fast and easy answer will soon be available regarding the amount of carbon that is sequestered. Meanwhile, trees will continue to do their part in cleaning the air we breathe, but active forest management is needed to provide healthy landscapes.

Again, thank you for the opportunity to provide a few comments. We will continue to follow the Committee's interim work and look forward to its final report and any possible legislation.

Sincerely,

Ellen Simpson

Ellen Simpson
Executive Vice President

Carbon Sequestration Study
Draft

Comments

Dan Kieke
Chevron

1. Page 2, ETIC Carbon Sequestration Findings, Finding #2 – It would be relevant to point out that most of the storage capacity predicted for this region by the Big Sky partnership is not in Montana.
2. Page 3, Finding #1 – this is somewhat misleading because it implies that all the geologic formation types listed – oil reservoirs, coal seams, saline aquifers, and basalts – exist in Montana. The basalt formations in the region are found in Washington, Oregon and Idaho.
3. Page 4, Finding #5 – Wyoming has not addressed the liability issue, but it may be worth pointing out that, at the other extreme, Texas approved legislation for FutureGen projects where the state would accept liability for CO_2 stored underground.
4. Page 4, Finding #8 – In addition to the risks listed, leakage of CO_2 to the surface poses a health risk to humans because CO_2 is denser that air and will, therefore, accumulate in low lying areas or areas without significant atmospheric dispersion, posing a risk of asphyxiation.
5. Page 6, paragraph 1 – Power plants are identified as the source of CO_2 emissions. While power plants are a major source of CO_2 emissions, and perhaps the most relevant for Montana, they are not the only source of CO_2 emissions.
6. Page 8, -
    a. The description of **Geological Carbon Sequestration** states that captured CO_2 is liquefied. This is misleading because captured CO_2 would most likely be transported and injected as a supercritical fluid, not as a liquid.
    b. Suitable geologic formations are described as domes. All geologic structures suitable for storage are not necessarily dome-shaped structures.
    c. The **EOR** process is described as using alternate flows of water and CO_2. This is commonly called a WAG process and is commonly used in CO_2 EOR floods today because the water slugs improve the flow of the CO_2 through the reservoir, leading to higher recoveries. However, this is not the only way CO_2 flooding can be applied and may very well not be the best way if the intent is to maximize the amount of CO_2 injected into and stored in a reservoir.
    d. The CO_2 **EOR** mechanism is described as "the carbon makes the oil expand so it flows more easily." First, it would be carbon dioxide and not carbon that would make the oil expand. And second, this description is not entirely accurate. Increased production from oil volume expansion is what immiscible CO_2 relies on as a recovery mechanism. For miscible flooding, which is preferred because it yields higher oil recoveries, the injected CO_2 and the reservoir oil mix intimately forming a single phase that flows through the

reservoir and increases oil recovery primarily because other mechanisms are operating, including reduced interfacial tension and reduced viscosity.

e. The 35 million tons CO_2 being injected for EOR should read 35 million tons/yr.

7. Page 9, -
   a. The comment "Most CO_2 that is currently used in the United States comes from natural carbon sinks …" should read "Most CO_2 that is currently used in the United States comes from natural CO_2 reservoirs …"
   b. The idea of removing injected CO_2 for later use for EOR is an interesting concept and certainly changes the definition of stored CO_2 from waste to commodity. However, it does raise issues with how credits given to stored CO_2 would be handled if that CO_2 is later produced.
8. Page 10, -
   a. Care should be taken interpreting seismic results as conclusively showing that CO_2 has not leaked from the Sleipner project. The seismic results only indicate that volumes exceeding the limits of detection are not observed to have moved from the target storage formation.
   b. Suggest rewording "Some tests have shown that carbon dioxide is about twice as adsorbing on coal as methane" to "Some tests have shown that coal will adsorb about twice as much carbon dioxide as methane."
   c. The discussion of storage in unmineable coal seams fails to mention the potential for swelling that may accompany adsorption of CO_2 on the coal surface. Swelling may reduce future injectivity of CO_2 into a coal seam and reduce the accessible surface area for additional CO_2 sequestration. This is probably a greater potential drawback to the technology than inability to mine the coal in the future.
9. Page 25, -
   a. Suggest a recommendation be made to the legislature that adequate consideration be given to the cost of capture. In this document, $25/ton is quoted from the MIT "Future of Coal" report as being used for a "high price trajectory" for their modeling studies because this cost makes carbon capture and storage more economically feasible. The MIT report bases this comment on the assumption that $25/tonne would be sufficient to offset the cost of capture and compression and $5/tonne for transportation and storage. We consider these prices to be extremely optimistic, especially the capture costs. We suggest that the point be emphasized more strongly that these costs are uncertain, that a wide range of predicted costs exists and that the costs quoted here for capture are at the low end of current predictions.
   b. Suggest changing "The feasibility and costs of capture however vary widely based on size, age and efficiency of a plant" to "The feasibility and costs of capture are site specific and depend on the size, age, efficiency of a plant, availability of plot space for capture and compression equipment and type of fuel burned (gas vs. coal).
10. Page 25, Table 2 – "Without capture and geological storage" should read "With capture and geological storage."
11. Page 26, Table 3 –

a. Recommend changing "Chilled Ammonia Process – (capture carbon downstream of flue gas)" to "Chilled Ammonia Process – (capture carbon in flue gas)."
b. Capital costs for amine scrubber and chilled ammonia processes are quoted as being the same. We recommend pointing out that these costs for the chilled ammonia process are uncertain and likely to be optimistic.

12. Page 28, -
    a. Pumping CO_2 from a reservoir is mentioned as a groundwater contamination mitigation strategy. This is just one potential mitigation strategy. A project plan would include a risk assessment that would identify potential risks and include mitigation plans for dealing with any eventualities, including possibly pumping CO_2 from a reservoir.
    b. The concern about re-release of injected CO_2 undoing the benefits of sequestration needs to be put into proper context. As long as more CO_2 remains in the ground than was produced during the capture, transport, and injection of the CO_2, then there has been a net reduction in emissions to the atmosphere.

LC4002

Comments

Dan Kieke
Chevron

Section 5. 2. Regarding the determination that an underground reservoir is depleted of oil or gas: Will some consideration need to be made for changes in technology that ultimately lead to a redefinition of what a depleted reservoir may be? What may be unrecoverable oil or gas resources today may not be unrecoverable in the future. CO_2 injection for storage may prevent application of improved technologies to recover this additional oil or gas. How will the mineral rights owner's interests be protected against this eventuality?

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July 10, 2008

Honorable Harry Klock, Chairman
Energy and Telecommunications Interim Committee
P. O. Box 201706
Helena MT 59620-1706

Subject: MPA Comments on LC-4002 (Pore Space)

Dear Representative Klock:

The Montana Petroleum Association (MPA) is a member based trade association that represents oil and gas exploration, production, transportation and refining in Montana. With over 100 members we represent a wide spectrum of the oil and gas industry. We have participated in interim meetings of the Energy and Telecommunications Committee (ETIC) and are interested in your work to date. MPA has grave concerns with LC 4002, pore space ownership, draft legislation. We appreciate the opportunity to share these concerns with you and members of the committee.

Current Montana law 70-16-101, MCA was enacted in 1895 and recodified over the past 108 years and has not been challenged. It has served the State and its citizens well without issue. It says in full: **"Right of owner in fee-above and below the surface.** The owner of land in fee has the right to the surface and to everything permanently situated beneath or above it." This statute has not presented problems in application and MPA asserts our existing laws need not be changed at this time.

Secondary and tertiary methods have been employed for decades to maximize production and recovery of oil. LC 4002 raises numerous legal, operational, and technical issues including the apparent creation of another property estate. In addition, the unknown consequences of this legislation on both the surface and mineral owner cause concern. While we very much appreciate the ETIC's efforts to address the issue, we fear implementation of LC 4002 will do much more harm than good.

LC 4002 creates many questions about the effect of current industry practices. For example, section 5, paragraph 2 of the draft states that if it is determined that a reservoir is depleted or abandoned the pore space reverts to the owner of the surface. While a determination of an abandoned well is regulated by the Board of Oil and Gas Conservation, they do not make an abandoned determination based on a zone or reservoir. Furthermore, it is widely known by petroleum experts that primary, secondary, and tertiary recovery methods never remove all, or even a majority, of the oil in place in a zone or reservoir.

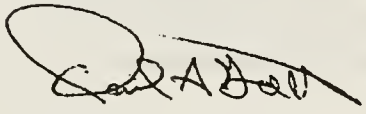
Liability appears to be the most significant issue facing surface owners, industry and the legislature as we work to develop a frame work for carbon capture and storage (CCS). Add the fact that EPA and DEQ are considering how to treat CO2. Consider the consequences on the surface owner of defining CO2 as a hazardous waste or pollutant. Without addressing liability it is premature to address pore space ownership.

We are also concerned about the operational feasibility of using a county surveyor to review the property right transfer document. Most counties no longer have a county surveyor. In fact, many larger counties do not have a full time county surveyor, and they rely on contract service. This requirement would undoubtedly increase the workload and expense to the counties, particularly section 6 (2) (a), which requires geologic expertise. Allowing the surface owner to void a contract because the description is inaccurate is troublesome given the difficulty of describing the geologic strata. This ability to void a contract may cause investors to look with skepticism about the ability to sequester the carbon or make use of enhanced oil recovery in Montana.

Finally, we have heard of some concern about a similar bill passed in Wyoming during their last legislative session. There are some fears that it will be challenging to implement or may have unintended consequences on our industry. We see no compelling reason to act hastily, and not enacting pore space legislation would give all parties the opportunity to review Wyoming's implementation as well as monitor other States and Congress.

There are too many areas that have unknown consequences regarding pore space and the creation of another property estate. MPA urges the committee not to move forward with a committee sponsored bill.

Best Regards:



David A. Galt
Executive Director

2008 Montana Stockgrowers Association
Interim Policy

CARBON SEQUESTRATION

WHEREAS: Carbon sequestration legislation is being reviewed by the legislative interim committee during the 2008 interim, and

WHEREAS: Many unknowns exist regarding the concept of sequestration, which may have consequences for landowners

BE IT RECOMMENDED: MSGA urge the MT legislature to fully study the issue of carbon sequestration and potential ramifications to landowners to address all consequences of implementing the concept in Montana.

Errol T. Galt
106 71 Ranch Rd
Martinsdale, MT 59053

July 3, 2008

The Honorable Harry Klock
Chairman, Energy and Telecommunications Interim Committee
P. O. Box 201706
Helena, MT 59620-1706

Dear Chairman Klock and Members of the Committee,

As a landowner concerned about my rights to use the surface of my property I submit the following comments to the Committee regarding proposed legislative bill drafts LC 4002 and 4003.

LC 4002 proposes to ensure that pore space under a person's private property is also owned by the surface owner. State law already states that an owner of the surface owns to the center of the earth below the surface estate. While I respect and appreciate the willingness of the Committee to ensure my private property rights, I believe that introducing this bill in the 2009 Legislative session is premature. I have been paying close attention to the climate change debate, in particular, carbon storage issues and how they might affect my ability to control my surface property. There is no doubt that pore space is owned by the surface property owner, creating a separate new property estate without resolving other issues related to carbon storage is not wise. No work has been done to clarify the huge potential liability issues that surround carbon storage. Furthermore, the EPA has yet to decide if CO2 is a pollutant. If the EPA rules that CO2 is a pollutant would the surface owner become responsible for the clean up? These are just a couple of the many questions that need answers before you pass a pore space ownership bill. I strongly oppose LC 4002 and urge you to table the draft bill in any form.

LC 4003 proposes a study of other issues regarding geologic sequestration of carbon. I support the efforts of the committee to study the issues outlined in LC 4003. I also suggest you add pore space ownership, enhanced oil recovery and mineral interest conflicts to the areas that you are intending to study. If the Committee feels compelled to venture into developing a framework for regulating carbon capture and storage, a thorough and detailed study over the next two years makes sense.

I also question if the $25,000.00 appropriation in the draft bill will be sufficient to complete such a broad and important study.

I appreciate the opportunity to comment. It is unlikely that I can attend the ETIC meeting on July 16th, and I would appreciate it if your staff could ensure that each member of the Committee has a copy of this letter.

Sincerely,

Errol T. Galt

Errol T. Galt
71 Ranch, Sun Coulee Ranch

Table 4-1. CCAC-recommended policy options and results for the energy supply sector

	Policy Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2007–2020 (Million $)	Cost-Effectiveness ($/tCO2e)	Level of Support
		2012	2020	Total 2007–2020			
	Energy Supply						
ES-1	Environmental Portfolio Standard (Renewables and Energy Efficiency)						UC
	Efficiency/Conservation	0.03	0.92	5.4	–$79	–$15	UC
	Renewable Energy	0.0	1.6	5.5	$53	$10	UC
ES-2	Renewable Energy Incentives and Barrier Removal	*Not quantified separately (see ES-1 and ES-4)*					UC
ES-3	Research and Development (R&D), Including R&D for Energy Storage and Advanced Fossil Fuel Technologies	*Not quantified*					UC
ES-4	Incentives and Barrier Removal for Combined Heat and Power (CHP) and Clean Distributed Generation (DG)						UC
	Distributed Renewables	0.03	0.10	0.8	$16	$21	UC
	Combined Heat and Power	0.2	0.7	5.0	$81	$16	UC
ES-5	Incentives for Advanced Fossil Fuel Generation and Carbon Capture and Storage or Reuse (CCSR)						UC
	Reference Case	0	1.0	4.5	$135	$30	UC
	High Fossil Fuel Scenario	0	5.2	24.4	$733	$30	UC
ES-6	Efficiency Improvements and Repowering of Existing Plants	*Not quantified*					UC
ES-7	Demand-Side Management	*Not quantified separately (see ES-1 and RCII-1)*					UC
ES-8/9	Market-Based Mechanisms to Establish a Price Signal for GHG Emissions (GHG Cap-and-Trade or Tax)	*Not quantified*					UC
ES-10	Generation Performance Standards or GHG Mitigation Requirements for New (and/or Existing) Generation Facilities, With/Without GHG Offsets	0.1	0.8	4.7	$60	$13	UC
ES-11	Methane and CO_2 Reduction in Oil and Gas Operations, Including Fuel Use and Emissions Reduction in Venting and Flaring						UC
	Reference Case	0.1	0.5	3.9	*Not estimated*	*Likely net benefit*	UC
	High Fossil Fuel Case	0.3	0.8	6.6			UC
ES-12	GHG Reduction in Refinery Operations, Including in Future Coal-to-Liquids Refineries						UC
	Coal-to-Liquids – High Fossil Fuel Case	0	9.9	35	*Not estimated*	*Not estimated*	UC
	Petroleum Refining - Reference Case	0.02	0.24	1.5	*Not estimated*	*Not estimated*	UC
	Petroleum Refining - High Fossil Fuel Case	0.03	0.38	2.2	Not estimated	Not estimated	UC

	Policy Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2007–2020 (Million $)	Cost-Effectiveness ($/tCO_2e$)	Level of Support
		2012	2020	Total 2007–2020			
ES-13	CO_2 Capture and Storage or Reuse (CCSR) in Oil & Gas Operations, Including Refineries and Coal-to-Liquids Operations	*Incorporated in ES-5 and ES-12*					UC
	Sector Total After Adjusting for Overlaps (Among ES Options and After Demand Reductions From RCI Options)						
	Reference Case	**0.4**	**4.2**	**21.9**	**$272**	**$17**	
	High Fossil Fuel Case	**0.4**	**18.7**	**79.4**	**$870**	**$24**	

UC – Unanimous Consent

Climate and Carbon Related Activities in Region					
State	Renewable Portfolio Standard	Emissions reduction proposals	Climate Change advisory committee	CO2 sequestration (geological) oversight	Terrestrial sequestration board
MT	15% by 2015 20% by 2020 25% by 2025 (recommendation by MCCAC)	1990 levels by 2020 Additional 80% reduction by 2050 (recommendation by MCCAC)	Climate Change Advisory Council developed strategies to reduce and sequester GHGs promote economic growth and develop action plan	ETIC study, findings, pore space ownership proposals University-level activities	University-level activities
WY	None	None	State agency conducting an inventory of GHG sources to establish emissions baseline	Legislation (HB 89 and HB 90) approved in 2008. Department of Environmental Quality Oversight. Task force formed.	Carbon Sequestration Advisory Committee approved through legislation
WA	15% by 2020 for those serving more than 25,000 customers	1990 levels by 2020; 25% below 1990 levels by 2035; 50% below 1990 levels by 2050	Washington Climate Change Challenge developing strategies for achieving climate goals Climate Advisory Team developing recommendations	Approved SB 6001 requiring the Washington Department of Ecology to engage in rulemaking for regulation of sequestration (liability, property rights not addressed in legislation)	Conservation Innovation grants; university activities
CO	20% by 2020, with 4% from solar for investor owned utilities 10% for cooperatives and municipal utilities Increase to 30% for investor-owned utilities and 15% for cooperatives and municipal utilities, with no more than 85% from wind power (recommendation of CAP)	20% by 2020 Additional 80% reduction by 2050 Both compared to 2005 levels	Climate Action Panel (public & private) 70 recommendations completed 11/07	Work with neighboring states on regional approach to transportation and sequestration (recommendation by CAP)	Legislature commissioned University of Colorado, Colorado State University and Colorado School of Mines to research geological and terrestrial opportunities
ID	None	None	Climate Action Plan (in progress)	None	Carbon Sequestration Advisory Committee created by legislation in 2002
NM	20% by 2020	2000 levels by 2012; 10% below 2000 levels by 2020; 75% below 2000 levels by 2050	Climate Change Action Plan and Climate Change Advisory Group. Advisory Group recommending greenhouse gas emission reduction actions.	Oil Conservation Division (recommendation) Recommended regulations pending, expected to be issue during 2008 legislative session.	University-level activities

Source: Pew Center on Global Climate Change, March 2008
http://www.pewclimate.org/what_s_being_done/in_the_states/state_action_maps.cfm

NATIONAL CONFERENCE *of* STATE LEGISLATURES

The Forum for America's Ideas

MEMORANDUM
To: Sonja Nowakowski, Montana
From: Courtney Welch, NCSL
Re: Carbon Capture and Sequestration Legislation
Date: March 24, 2008

There are 31 other states considering similar legislation on carbon capture and sequestration. Below is a list of the states that are currently considering legislation in the 2008 session, with bill citation and summaries. Wyoming has emerged as the first state to directly address pore space ownership as it relates to sequestration through a regulatory framework.
Legislation in other states range from:

- the creation of study committees, task forces, studies and reports
- allowing the state's EPA to adopt regulations on carbon capture and sequestration
- the study and establishment of a carbon capture registry and reporting systems
- a sequestration technology development and assistance fund, R&D funding and appropriations
- amending the definition of "clean coal" to include carbon capture and sequestration
- including carbon capture and sequestration in alternative energy portfolio standards or RPS
- tax credits and incentives and property tax exemptions for carbon capture and sequestration equipment or project costs

States Considering Legislation on Carbon Capture and Sequestration:

You can link to the actual text of each of these bills from our website:
http://www.ncsl.org/public/leglinks.cfm

Arizona

- HB 2542 Study and report identifying opportunities for carbon capture and sequestration

California

- SB 572 (failed) Urges the State Air Resources Board to consider the benefits created by carbon sequestration within forests

Connecticut

- HB 5600 Includes carbon sequestration in global warming solutions

Georgia

- HB 1211 carbon sequestration registry

Hawaii

- HB 678, SB 890, HB 226 Greenhouse gas reduction goals, includes carbon capture and funding, creates a task force

Iowa

- SB 391, SB 500, HSB 304 Permits and requirements for carbon sequestration

Illinois

- SB 1187,
- HB 1135,
- HB 1777 Creates a FutureGen project within the state, includes carbon capture
- SB 1187 Provides funding
- **SB 1592: Enacted: Chapter 95-481 on 8/28/07.** The Agency may develop, finance, construct, or operate electric generation and co-generation facilities that use indigenous coal or renewable resources, or both, financed with bonds issued by the Authority on behalf of the Agency. Preference shall be given to technologies that enable carbon capture and sites in locations where the geology is suitable for carbon sequestration.

Indiana

- SB 224, HB 1117 Tax credits for carbon capture

Kansas

- HB 2429 fund
- HB 2419 tax exemptions
- HB 2765 requires carbon capture and sequestration for future coal projects,
- SB 553 carbon offset credit for carbon capture technologies

Kentucky

- **HB 716:** Pending. options and strategies that may be cost-effective for utilities to employ in response to a likely carbon dioxide emissions reduction mandate, including but not limited to: (a) The retrofit installation of carbon capture processes and technologies for existing fossil fuel power plants and the incorporation of integrated carbon capture processes and technologies in all future fossil fuel power plants for which construction is commenced or was completed after July 1, 2010;

Massachusetts

- HB 3337 promotes sequestration,
- SB 1940 includes sequestration in the alternative energy portfolio standard

- SB 2457 Includes carbon capture in definition of "alternative energy generating source"

Maryland
- SB 309/ HB 712 Includes carbon sequestration in global warming solutions

Maine
- HB 1290 "Carbon dioxide emissions offset project" includes sequestration

Michigan
- SB 707 Provides for carbon dioxide capture and sequestration; relates to a carbon dioxide injection well and any associated equipment and machinery; provides for a fund; relates to underground storage facilities; requires a permit; allows for a fee and fines for violations; authorizes entrance onto private property to determine compliance.
- SB 708 property tax exemptions for carbon dioxide capture equipment
- SB 801 tax incentives for carbon dioxide capture and sequestration
- HB 5604 business tax credit toward certain costs incurred during carbon dioxide sequestration and capture

Minnesota
- HB 436 Capture and geologic sequestration as part of the Next Generation Energy Act
- SB 450 or SB 1783 or SB 2096 Provides funding or appropriates money for R&D
- HB 1666 requires studies and reports on carbon capture and sequestration

Missouri
- HB 1666 or HB 1842 Included carbon sequestration in Global Warming Solutions Act

North Carolina
- HB 1115 Includes carbon sequestration in swine farm standards
- HB 1961 Requires reports on carbon sequestered from hog, tobacco and chicken farms

Nebraska
- LR 188 and L 921 Creates a carbon sequestration advisory committee

New Jersey
- SB 2976 and AB 4559 (2006) Promotes sequestration of carbon

New Mexico
- SB 234 An appropriation to state Institute of Mining and Technology for carbon sequestration project
- HB 2 Funds for federal carbon sequestration project

New York

- AB 5038 Includes study of carbon sequestration in Clean State and Clean City Act
- SB 6276 and AB 3414 New York State Greenhouse Gases Management research and development program to promote new technologies and processes which will avoid, abate, mitigate, capture or sequester carbon dioxide and other greenhouse gases

Ohio

- HB 357 Expands the laws governing energy development to include carbon capture
- HB 119 Appropriations for carbon capture
- SB 221 Supervision of carbon sequestration projects in the state

Oklahoma

- EO 10 Carbon Sequestration Advisory Committee
- SB 1765 Relates to geologic storage of carbon dioxide; creates the Geologic Storage of Carbon Dioxide Act; provides short title; states findings; provides for determination of appropriate agency regulation; states jurisdiction and regulatory authority; defines terms; authorizes reservoir as storage facility for carbon dioxide; states procedures; requires certain filings and certification; authorizes agency to promulgate rules.

Pennsylvania

- SB 789 and HB 1202 or HB 2a. Allows coal-to-liquids as a renewable resource if carbon is sequestered or off-set
- HB 110 Report on global warming impacts, study of carbon capture

Tennessee

- HB 2327 Authorizes division of forestry to establish system for carbon sequestration registration

Utah

- SB 202 Requires certain state agencies to make rules concerning carbon capture

Virginia

- SB 446 Requires that by a certain year electric energy sold by each supplier to retail customers be generated from renewable generation energy sources, requires new facility to be carbon capture compatible

Vermont

- SB 339 Creates a monitoring program for forest carbon sequestration
- SB 309 Establishes a greenhouse gas reduction oversight program to evaluate state agency progress in reducing emissions, includes study of carbon capture
- SB 350 Develop recommendations and incentives for carbon sequestration on farm and forest land

Washington

- SB 5359 Greenhouse Gas Reporting Study Panel, will study carbon sequestration programs
- HB 2156 Requires out of state utilities to show mitigation plans to reduce emissions, plans can include carbon capture and sequestration.
- SB 5216 Promotes programs or projects for carbon sequestration
- SB 6001 and HB 3105 Climate Change Mitigation study forest sequestration and other sequestration options

Wisconsin

- SB 81 Management of greenhouse gases includes carbon sequestration

West Virginia

- SCR 11 Requesting Joint Committee on Government and Finance study sequestration of greenhouse gases

Wyoming

- SB 1 One million two hundred twenty-three thousand eight hundred sixty-six dollars ($1,223,866.00) for evaluation of potential carbon dioxide sequestration sites and activities related to the advancement of clean coal and carbon management activities;
- **HB 89** Provides that the ownership of all pore space in all strata below the surface lands is declared to be vested in the owners of the surface above the strata; provides that a conveyance of surface ownership shall also convey the pore space; provides that pore space may also be conveyed in the same manner as the transfer of mineral interests; provides for the description of the pore space in conveyances; defines pore space as subsurface space which can be used as storage for carbon dioxide or other substances.
- HB 90 Relates to carbon sequestration; provides for regulation by the department of environmental quality of the injection of carbon dioxide and associated constituents; provides for an appropriation.

CCS and Pipeline Issues: Pending legislation

- Michigan (S.B. 1166) includes pipeline costs in the calculation of business tax credits for carbon capture and sequestration projects.
- Minnesota's pending legislation (S.B. 1586 and H.B. 2307) provides for carbon-dioxide pipeline rights-of-way.
    - Sec. 5. CARBON DIOXIDE PIPELINE RIGHTS-OF-WAY. The Public Utilities Commission shall have the responsibility for approving the Minnesota portion of the routing of all proposed pipelines to transport carbon dioxide to sequestration sites within or outside the state. To the extent reasonably practicable, pipelines shall be located on existing rights-of-way and the Minnesota Department of Transportation and all electric and gas utilities shall make any and all of their rights-of-way available for the carbon dioxide pipelines with compensation solely to cover actual out-of-pocket (...)

State activities on carbon sequestration
May 1-2, 2008 Energy and Telecommunications Interim Committee
Prepared by Sonja Nowakowski

The information provided below offers a snapshot of the regulatory framework that other states are contemplating for geological carbon sequestration. This information supplements the summary provided by the National Conference of State Legislatures. Wyoming, Washington, New Mexico, and Oklahoma are four states that have addressed, or are in the process of addressing, issues similar to those before the 2007-08 Energy and Telecommunications Interim Committee. The information provided below outlines how those states are handling issues related to jurisdiction, oversight, liability, ownership, eminent domain, and funding.

Wyoming

Wyoming is the first state to enact comprehensive carbon sequestration legislation that designs a legal framework for storing carbon underground. In March, Wyoming Governor Dave Freudenthal signed into law two bills, House Bill Nos. 89 and 90, associated with the ownership and regulation of carbon sequestered and stored underground. The law takes effect July 1, 2008. In addition, during Wyoming's 2008 interim, a legislative committee will study clean coal incentives. Wyoming also authorized the DEQ to submit an application to the federal office of surface mining for $1.2 million to evaluate carbon sequestration sites and activities and the advancement of clean coal and carbon management activities in Wyoming.

Jurisdiction

Wyoming currently has primacy over Class I-V wells in the Underground Injection Control program.

Agency Oversight, permitting and regulations

House Bill 90 requires the Wyoming Department of Environmental Quality to expand the Underground Injection Control program to include carbon sequestration and to develop rules to regulate sequestration activities. The Wyoming Board of Oil and Gas is granted jurisdiction over the subsequent extraction of sequestered carbon for commercial or industrial purposes.

Liability

The Wyoming legislation does not spell out who or what entity is liable if carbon sequestered underground migrates beyond its permitted perimeter. The legislation only notes that regulations cannot be construed to create any liability by the state for failure to comply.

Ownership

House Bills 89 addresses the ownership of the pore space. The bill establishes that pore space is owned by the surface owner. It allows that pore space is conveyed with the surface, unless the space has been previously conveyed or is explicitly excluded. Carbon sequestration would not affect the common law related to mineral estate dominance.

Eminent Domain
The Wyoming legislation did not alter the state's existing eminent domain laws to include carbon sequestration pore spaces or pipelines.

Funding
House Bill 90 also creates a working group, which includes the Wyoming Board of Oil and Gas supervisor, the state geologist, and the DEQ director, to design bonding procedures for sequestration. The working group must report back to an interim committee concerning bonding or other financial assurances by September 2009. The working group was given $250,000 from the general fund for expenses related to its task.

New Mexico

New Mexico is currently studying the issue of geological sequestration. Executive Order 2006-69 required the New Mexico Energy, Minerals, Natural Resources Department Oil Conservation Division to identify statutory and regulatory requirements needed to geologically sequester carbon. The report was completed in December 2007. The New Mexico Legislature is not expected to contemplate legislation on the subject until its 2009 session.

Jurisdiction
New Mexico currently has primacy over Class I-V wells in the Underground Injection Control program.

Agency Oversight, permitting and regulations
The recently completed study recommends the Oil and Gas Conservation District oversee a carbon sequestration program.

Liability
This issue is raised in the report, and the OCD requests direction from the New Mexico Legislature on the subject.

Ownership
The report recommends that surface owners maintain ownership of pore space.

Eminent Domain
This issue is raised in the report, and the OCD requests direction from the New Mexico Legislature on the subject.

Funding
This issue is raised in the report, and the OCD requests direction from the New Mexico Legislature on the subject.

Washington

The Washington Legislature approved legislation that requires utilities to develop greenhouse gas mitigation plans. Fossil-fueled electric units must calculate maximum potential for carbon emissions, and then provide mitigation for those emissions. A utility can pay per metric ton to mitigate, purchase carbon credits, or invest in mitigation projects. New fossil fuel plants also must meet emissions performance standards. Included in the legislation was direction to the Department of Ecology to draft rules guiding geological carbon sequestration. The Department was given until June 2008 to finalize the rules.

Jurisdiction

Washington currently has primacy over Classes I-V wells in the Underground Injection Control program.

Agency Oversight, permitting and regulations

The Department of Ecology recently released rules to guide the sequestration and storage of carbon underground. Permanent sequestration projects approved by the Department of Ecology must be in accordance with standards that insure 99% containment for 1,000 years.

Liability

Legislation has not addressed this issue. The department is operating under the assumption that the owner or operator of an injection project and site maintains liability, and any change in the liability scheme would need to be granted by the Legislature.

Ownership

Current legislation does not address the issue of ownership. The Department of Ecology is operating under existing mineral ownership laws, where the surface owner is expected to be the pore space owner in a sequestration project.

Eminent Domain

Existing laws are narrowly focused, with a high bar for eminent domain takings.

Funding

Based on the rules, a sequestration plan must include financial requirements, including a closure and post-closure letter of credit to cover all expenses. The amount of those requirements has not yet been set.

Oklahoma

The Oklahoma Legislature is considering Senate Bill No. 1765. The legislation has been approved and sent to the Governor. It is modeled largely after the Interstate Oil and Gas Compact Commission model regulations that were discussed and reviewed by the ETIC in January. The Oklahoma Legislature adjourns May 30, 2008.

Jurisdiction
Oklahoma currently has primacy over Class I-V wells in the Underground Injection Control program.

Agency Oversight, permitting and regulations
The Department of Environmental Quality and Corporation Commission, which is similar to the Montana Public Service Commission, are instructed to develop a memorandum of understanding outlining shared regulatory oversight. The agency is charged with developing a permitting system, rules, and sufficient financial sureties necessary in implementing the program.

Liability
After a "Certificate of Completion of Injection Operations" is issued by the regulating agency, 10 years after cessation of the operation or another time frame determined by rule, the operator is released from all liability. Future responsibility is to be covered by the Carbon Dioxide Storage Facility Trust Fund.

Ownership
The legislation does not directly address the issue of ownership. However, it is based on the Interstate Oil and Gas Compact Commission model regulations, which indicates the surface owner also owns the pore space.

Eminent Domain
The proposed legislation allows for the use of eminent domain in acquiring pore space for geological carbon storage.

Funding
The regulating agencies are charged with overseeing a Carbon Dioxide Storage Facility Trust Fund in the Oklahoma Treasury. The agencies will be authorized, by subsequent legislation, to establish a fee that is placed on each ton of carbon dioxide that is injected to fund the trust. A per ton fee, collected as a percentage of the fee established in the trust -- to be determined by the regulating agencies -- also is levied on the storage operator. The second fee is to fund administration and enforcement of the program.

Interstate Oil and Gas Compact Commission Model Statutes

Analysis prepared by Sonja Nowakowski
January 24, 2008

The following analysis was prepared at the request of the Energy and Telecommunications Interim Committee(ETIC) Chairman Rep. Harry Klock. The full ETIC also requested additional information on the Interstate Oil and Gas Compact Commission model statutes. At the ETIC's January 2008 meeting the points covered in this report will be discussed. These comments also have been shared with the Montana Board of Oil and Gas Conservation (MBOG) and the Montana Department of Environmental Quality (DEQ) Water Protection Bureau. Their comments are attached, and Tom Richmond of the MBOG and Bonnie Lovelace and Paul Skubinna of the DEQ will be available to answer additional questions about their comments.

Throughout the analysis below, there are two issues that merit consideration: 1.) CO2 is viewed as a commodity not a hazardous substance under the IOGCC model statute; and 2.) the Environmental Protection Agency (EPA) has announced it intends to develop regulations in this arena. Classification of CO2, either as a hazardous substance or a commodity, by the EPA will determine and influence any state statute that is implemented.

Without the EPA guidelines, the ETIC may be limited in its efforts to discuss potential legislation. The analysis below attempts to highlight areas, where the ETIC may consider legislation, without full knowledge of the pending federal guidelines. A summary of each section of the IOGCC model statute and discussion comments are provided:

Section 1. Jurisdiction

The IOGCC recommends that a state regulatory agency, presumably the MBOG, have the jurisdiction and authority over all persons and property necessary to administer and enforce carbon sequestration regulations. In doing so, the MBOG would be able to conduct hearings and promulgate and enforce rules, regulations, and orders concerning the geological storage of carbon dioxide.

Discussion points:
1. *Underground Injection Control program -- federal regulations*

Because the Environmental Protection Agency is developing regulations for carbon sequestration ensuring there is a permit system consistent with the Safe Drinking Water Act, it is uncertain whether a state agency may be granted jurisdiction in this arena. The Safe Drinking Water Act established the Underground Injection Control (UIC) program to allow the safe injection of fluids into the subsurface.

Under the UIC program, there are five well classifications:

EPA Injection Well Classification System		
Well Classes	Injection Well Description	Approximate inventory
Class I	-- Inject hazardous wastes beneath the lowermost Underground Source of Drinking Water (USDW) -- Inject industrial non-hazardous liquid beneath the lowermost USDW -- Inject municipal wastewater beneath the lowermost USDW	500
Class II	-- Dispose of fluids associated with the production of oil and gas -- Inject fluids for enhanced oil recovery -- Inject liquid hydrocarbons for storage	147,000
Class III	-- Inject fluids for extraction of minerals	17,000
Class IV	-- Inject hazardous or radioactive waste into or above a USDW. This activity is banned. These wells can only inject as part of an authorized cleanup.	40 sites
Class V	-- Wells not included in other classes. Inject non-hazardous liquid into or above a USDW.	Range from >500,00 to >685,000

Source: EPA

The EPA can authorize states to implement the UIC program. States can apply for primary responsibility, or primacy, over all classes of wells, only oil and gas wells (Class II), or all wells except oil and gas (Classes I, III, IV and V). If a state does not apply for and obtain primacy, then the EPA implements the program through regional offices. Native American tribes follow the same rules for primacy.

The EPA has delegated primacy for all well classes in 34 states. It shares responsibility in six states, including Montana. The EPA implements the program for all well classes in 10 states and on all tribal lands. To help pay for program costs, the EPA provides grant funds to delegated programs. States provide a 25% match.

In 1987, the Montana Legislature approved House Bill 795, granting the MBOG authority over Class II wells and developed a fee for the program. The bill included a "statement of intent" showing that the MBOG had to adhere to EPA guidelines. Montana, through the MBOG, submitted an application to EPA under Section 1425 of the Safe Drinking Water Act, 42 U.S.C. 300h-1, for approval of an UIC program governing Class II (oil and gas) injection wells. In November 1996, the EPA determined that the MBOG's UIC program for Class II injection wells met the requirements of the SDWA. Title 82, chapter 11, part 1, MCA grants the MBOG exclusive jurisdiction over all Class II injection wells.

In Montana, the EPA oversees Class I, III, IV, and V wells. The Montana Department of Environmental Quality has in the past discussed applying for oversight of Class 1, III, IV, and V wells but has not pursued an application.

In March 2007, the EPA released a recommendation that all carbon sequestration pilot projects be permitted under Class V experimental technology wells. In October 2007, the EPA announced its plans to develop regulations for long-term carbon sequestration. The EPA plans to propose regulatory changes to the UIC program in the summer of 2008 and then collect public comment as it works through the rule development process.

It is unknown at this time whether the EPA will create a new class of UIC wells for carbon sequestration projects, or develop guidelines under one of the existing well classifications. It also is unknown at this time, if the EPA will allow states to petition for oversight of UIC wells used for long-term carbon sequestration. Despite the unknowns, the ETIC could discuss a contingent delegation of authority over well classifications, including those used for the long-term storage of CO2. As noted above, the Legislature granted the state oversight over Class II wells nine years before the EPA granted the state primacy.

2. *Montana Climate Change Advisory Committee Draft recommendations -- Agency oversight*
Recommendations by the Montana Climate Change Advisory Committee Energy Supply Technical Working Group address sequestration and oversight. In a portion of an overall recommendation requiring power plants work toward fuel-neutral emissions levels, the MCCAC recommends fossil fuel-fired power plants file a plan with the DEQ that details the facility's commitment to capture CO2 and implement terrestrial and or geological sequestration as part of operating plans and permits.

The requirement would be established through rulemaking by the Montana Board of Environmental Review, based on the recommendation. The CCAC recommends that the DEQ petition for such a rule, and that the Legislature adopt supporting language.

During the 2007 Legislative Session, Senate Bill No. 218 was introduced. It authorized the Board of Environmental Review to adopt rules establishing a carbon sequestration program and permit system. The bill as amended also would have required the BER to hire a consultant to assist in rulemaking and consult with the MBOG and the Department of Natural Resources and Conservation in its implementation of a CO2 sequestration program. The bill was tabled in a House committee.

This raises the question of whether, if granted the ability to apply for oversight under the UIC program, the DEQ or MBOG is best suited to oversee a carbon sequestration program. The IOGCC model regulations note, "because most of the proposed CO2 geological storage regulations are based on natural gas storage and oil and gas injection well rules, the Task Force reasoned that states might well conclude that the most logical and best equipped lead agency for implementing and administering regulations effectively and efficiently would be the state oil and gas regulatory agency." The task force also recognized that some states may designate another agency, such as an environmental agency or public utility commission.

Section 2. Definitions

The IOGCC recommends defining terms, including carbon dioxide, reservoir, storage facility, storage operator, and geological storage. For background, "facility" is defined as the underground reservoir, underground equipment, and surface buildings and equipment used for a storage operation. "Reservoir" is defined as any subsurface sedimentary stratum, formation, aquifer, or cavity or void including oil and gas reservoirs, saline formations and coal seams suitable for injection and storage of carbon dioxide.

Discussion points

1. Existing definitions

If the committee chooses to pursue carbon sequestration legislation, definitions will merit additional discussion.

Section 3. Approval, record or order, certificate -- General requirements

Sections 3 and 4 are the heart of the regulatory structure in the IOGCC model statute. The IOGCC establishes a set of guidelines authorizing a state regulatory agency, presumably the MBOG, enter into an order, after public notice and hearing, approving a proposed storage facility and designating the horizontal and vertical boundaries of the storage facility. Before approving a storage facility, the agency must find:

1.) The facility and reservoir are suitable and feasible for injection and storage;

2.) That a good faith effort has been made to obtain the consent of a majority of the owners having property interests affected by the storage facility, and that the operator intends to acquire any remaining interest by eminent domain or otherwise allowed by statute;

3.) That the use of the storage facility will not contaminate other formations containing fresh water, oil, gas, coal or other mineral deposits; and

4.) That the proposed storage will not unduly endanger human health and the environment and is in the public interest.

Once the agency makes those four findings and grants an order of approval, a copy of the order would be filed in the probate court (or other appropriate jurisdiction) of the county or counties where the facility is to be located.

Prior to injecting carbon dioxide, the storage operator would be required to have a certificate titled, "Certificate of Operation of Storage Facility," which would include a statement that the storage operator has acquired by eminent domain, or otherwise, all necessary ownership rights with respect to the storage facility. The certificate would be on record in the county or counties where the facility is located and with the regulating agency. It also would include the date for which the facility is effective.

If the boundaries of the storage facility contain any depleted pool of hydrocarbons from a previously established field or producing unit, the agency in its approval order would require such units or fields be dissolved as of the facility's effective date.

Discussion points:

1. Uncertainty about federal guidelines

As discussed under Section 1 of this analysis, because the EPA has not released its proposed regulatory framework under the UIC program, it is unclear whether states will be in a role to establish rules. If states are in a position to have primary responsibility, it is expected that those rules would have to meet minimum federal guidelines and possibly be accepted by the EPA.

2. Montana Oil and Gas law as a comparison

Title 82 of the Montana Code Annotated outlines the provisions of mineral, oil, and gas exploration, extraction and reclamation, which may serve as a logical starting point for discussing a carbon sequestration framework.

Title 82, chapter 1 establishes compliance and notice for geophysical exploration. Prior to seismic work, surety bond, cash, certificate of deposit or other instrument in the amount of $10,000 is required to be on file with the secretary of state's office. An exploration permit is required., and the MBOG also must be notified in accordance with 82-11-122. Notification of the surface owner prior to any activity also is detailed. Noncompliance is deemed a misdemeanor. Title 82, chapter 11 further details regulation by the Board of Oil and Gas Conservation. This provides much of the backbone that would most likely be used in adapting CO2 regulations. It is discussed further in Section 4 of this report.

Section 4. Storage Project permitting -- protections

The IOGCC model statute grants the agency the ability to issue orders, permits, certificates, rules, and regulations, including establishment of financial sureties to regulate the drilling, operation, and well plugging and abandonment of a storage facility to protect against pollution, invasion, and the escape or migration of carbon dioxide.

In the model rules, which presumably would be implemented by the MBOG, the IOGCC provides further explanation. The model legislation, however, simply grants the agency the ability to promulgate such rules.

1. Montana oil and gas law as a comparison.
Title 82, chapter 11, allows the MBOG to "adopt and enforce rules and orders to effectuate the purpose and the intent of the chapter." It specifies oversight of Class II injection wells, including issuance of permits.

Title 82, chapter 11, outlines fees for processing applications, notice to surface owners, requirements for oil and gas operators, requirements relating to water protection, and administrative procedures, including public hearings and notice. Oil and gas regulations provide a clear outline for public participation and public review and comment of permitting decisions. The IOGCC model rules do not detail this, beyond that which is discussed in Section 3.

In Montana's oil and gas laws, a privilege and license tax is provided. Rehearing, court review for a person adversely affected by a rule or order is outlined. Civil and criminal penalties apply, if a person violates the any rule or law enumerated in Title 82, chapter 11. The model statutes do not provide an enforcement mechanism or provisions for penalty.

Proposed carbon dioxide legislation would need to grant an agency either broad or detailed rulemaking authority to provide the required details on permit issuance. Rules would be needed in multiple areas, including time frames for specific actions, notice and hearing requirements, and potentially requirements for CO2 facility operators. The IOGCC model statutes offer broad rulemaking authority, as do Montana's current oil and gas permitting laws.

2. Hazardous waste vs. commodity
If carbon dioxide that is injected into the subsurface is considered hazardous, the federal Resource Conservation and Recovery Act (RCRA) would need to be considered. For example, the Legislature has previously found that petroleum products and hazardous substances stored in underground tanks are regulated under the federal Resource Conservation and Recovery Act of 1976, as amended, and must be addressed and controlled properly by the state. The DEQ is authorized to establish, administer, and enforce an underground storage tank leak prevention program for these regulated substances.

In Montana a "hazardous waste," as defined in 75-10-403 MCA, is a waste or combination of wastes that:

"because of its quantity, concentration, or physical, chemical, or infectious characteristics, may:

(i) cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or

(ii) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of or otherwise managed."

Hazardous waste injection wells are not regulated under the Montana hazardous waste program, but are subject to requirements under a federal hazardous waste program. The owner or operator must have a permit issued by the EPA under the UIC program.

3. Water Quality considerations in Montana
The Montana Water Quality Act in Title 75, chapter 5, MCA provides guidance for the "prevention, abatement, and control of water pollution." The Board of Environmental Review is assigned the responsibility of establishing criteria to determine whether activities, or a class of activities, result in nonsignificant changes in water quality. Nonsignificant activities are enumerated in 75-5-317, MCA. It also is notable that in Montana, beyond stated exemptions, it is unlawful to construct, modify, or operate a disposal system that discharges into any state waters without a DEQ permit. "State waters" include surface and groundwater. The EPA in a letter to the Department of Energy concerning the IOGCC recommendations note that the model regulations "do not have the kind of overarching protectiveness standard that EPA requires of an approvable UIC program."

Section 5. Eminent domain or other authority

The IOGCC model statute empowers a storage operator, after receiving the approval of the MBOG, to exercise the right of eminent domain and to acquire all surface and subsurface rights and interests necessary for the purpose of operating a storage facility. The right of eminent domain would not prevent the right of a landowner to drill through a storage facility, in a manner approved by the MBOG. The right of eminent domain also would not prejudice the rights of landowners or other rights or interests for other uses.

The IOGCC recommends that because there are hearings for permitting and potentially for eminent domain, these hearings be combined to streamline the process.

Discussion points
1. Underground gas storage reservoirs in Montana
In 82-10-302 MCA, the underground storage of natural gas is determined to be in the public interest and welfare of the state. The law goes on to enumerate the use of eminent domain to acquire underground storage, as provided in Title 70, chapter 30. Acquisition is also limited to "the area of the underground sand, formation, or stratum that may reasonably be expected to be penetrated by gas displaced or injected into the underground reservoir." Certification for the use of eminent domain as well as proceedings that must be followed are enumerated.

The right to store natural gas in an underground reservoir must be secured by the operator prior to receiving a state permit to operate the project. If the right cannot be acquired voluntarily, the operator can request the state use eminent domain. Federal regulations, at least at the EPA level, aren't expected to address the issue of eminent domain. The ETIC may wish to discuss eminent domain and carbon sequestration as a public use as enumerated in 70-30-102, MCA.

2. Pipelines
During the 2007 Legislative Session, H.B. 24 was approved granting CO2 pipelines "common carrier" status. That bill, however, was void due to a contingency clause. With "common carrier" status granted for a pipeline, eminent domain also could be exercised as outlined in Title 70, chapter 30.

Section 6. Carbon Dioxide Storage Facility Trust Fund

The IOGCC model statute establishes a "Carbon Dioxide Storage Facility Trust Fund" that would be administered by the MBOG. A tax or fee equal to __$ per ton of carbon dioxide injected for storage is to be levied on each storage operator. The Trust Fund would be used for long-term monitoring at the site, including remediation of problems at the site and the plugging and abandoning of wells for use as observation wells.

Discussion points
1. Oil and gas production damage mitigation account
Title 82, chapter 11, part 1 establishes a damage mitigation account in the state special revenue fund. The MBOG controls the account. At the start of each biennium $50,000 from the interest income of the resource indemnity trust fund is allocated to the mitigation account. The fund, however, is capped at $200,000. The account also includes funds received from bonds for properly plugging dry or abandoned wells. The MBOG can authorize payment for the cost of properly plugging a well and reclaiming and/or restoring a site or other area damaged by oil and gas operations. The site must be abandoned, and the responsible person either cannot be identified or refuses to take corrective action.

2. Fee that meets future long-term needs
Because the state would assume liability for storage projects (see Section 8) and essentially the Carbon Dioxide Storage Facility Trust Fund would need to be sufficiently funded to cover problems for an undetermined period, establishing a reasonable fee would require analysis of multiple factors. It is possible that a single catastrophic event could deplete such a fund, unless certain safeguards are contemplated. Presumably, the trust fund also would allow the state to do future monitoring and remediation at a site that was closed. At this time, other states contemplating the IOGCC model statutes have not settled on an appropriate fee.

The IOGCC notes that during the post-closure period, which is an indefinite amount of time, seismic mapping of plume location, pressure samples from observation wells, additional monitoring wells, simulation models, ongoing monitoring of human activity in the area, monitoring of biological indicators, and adequate record keeping would all be necessary. These all could require substantial funding.

Section 7. Administration expenses

To fund administration and enforcement of the program during the operational phase of a storage facility, and to fund inspections, testing, and monitoring, an additional fee is recommended. Each storage operator would pay a per ton tax or fee collected as a percentage of the fee or tax levied in Section 6.

Discussion points

1. Oil and gas privilege and license tax

To provide funds for the expenses of the operation and enforcement of Title 82, chapter 11, an operator or producer of oil and gas in Montana pays an assessment not to exceed 3/10 of 1% of the market value of each barrel of crude petroleum produced, saved and marketed and the same rate on the market value of each 10,000 cubic feet of natural gas.

2. Oil and gas fees

Title 82 establishes a fee to defray the expenses incurred for processing an application from an operator or oil producer. The fee is based on the complexity of processing an application. Title 82, chapter 11 also requires the operator of a Class II injection well pay an annual operating fee not to exceed $300 per injection well. The fee is used to defray the expenses of operating and enforcing the Class II injection well regulatory program.

Section 8 Liability Release

Based on the IOGCC model statute, 10 years (or another time frame established by rule) after the storage operation ceases, the MBOG would issue a "Certificate of Completion of Injection Operations." The operator would show that the reservoir is "reasonably" expected to retain its integrity and remain underground. Ownership of the project and the carbon dioxide stored underground would then transfer to the state. With issuance of the "Certificate of Completion of Injection Operations," the MBOG would release the operator and all generators of the carbon dioxide from all liability associated with the project. Any performance bond posted by the operator would be released, and the MBOG would be responsible for continued monitoring at the site and any future remediation.

Discussion points

1. Precedent

The IOGCC notes that the intent of Section 8 is to allow for regulatory certainty by the industry and to promote sequestration efforts. The Task Force decided a 10-year time frame prior to release of liability would allow time to determine the integrity of a storage site. The IOGCC discussed time frames ranging from 3 to 10 years, noting, "the amount of time prior to release of the operator and generator from liability is ultimately a state decision."

This is a unique approach to the liability issue. There are no comparable models in Montana Code Annotated, where the state assumes complete liability for an activity or cleanup when an operator or owner can be identified and located. Because the carbon dioxide is expected to be sequestered underground for indefinitely, the state would be assuming this liability for an indefinite amount of time. While Montana's Constitution requires a two-thirds vote of the Legislature to limit state liability, there is no super majority requirement for creating a liability.

Section 9. Cooperative Agreements

The MBOG would be authorized to enter into cooperative agreements with other governments or government entities to regulate storage projects that extend beyond state regulatory authority.

Discussion points
This is similar to 82-11-112, MCA, which authorizes the MBOG to cooperate with any other state, interstate, or federal agency to effect Montana's oil and natural gas regulations and expend the funds necessary to do so.

Section 10. Enhanced hydrocarbon recovery operations.

The MBOG would be authorized to develop rules allowing for the conversion of enhanced oil recovery operations into storage facilities. It clarifies that the geological sequestration requirements outlined in the model statute would not apply to carbon dioxide projects exclusively used for enhanced oil or gas recovery.

Discussion points
Enhanced recovery is defined in Montana code. The MBOG currently has rules under 36.22.1401-36.22.1425 for the injection well, under Class II..

January 4, 2008

To: Energy and Telecommunications Interim Committee
From: Montana Board of Oil and Gas Administrator, Tom Richmond
Re: Interstate Oil and Gas Compact Commission (IOGCC) Model Statute and Rules

The following comments are intended to accompany the January 24, 2008 IOGCC analysis prepared by Sonja Nowakowski, staff for the Energy and Telecommunications Interim Committee. The comments are in same format as the original analysis, with discussion points under each section of the IOGCC model statute.

The information below should clarify and detail the original analysis from the perspective of the Montana Board of Oil and Gas, which also is a member of the Interstate Oil and Gas Compact Commission.

Section 1. Jurisdiction

1. Underground Injection Control program -- federal regulations

During the IOGCC Task Force discussion it was decided to "soften" the suggestion for the oil and gas regulatory agency to assume jurisdiction over geological storage as the committee recognized the wide variance in state programs. The IOGCC uses "state regulatory agency" somewhat generically; nevertheless, they recommend using the (natural) gas storage statutes as an analogue, which are usually administered by the state oil and gas agency.

Montana is an active member of the Ground Water Protection Council (GWPC). GWPC has been asked to provide language for the recently introduced Lieberman-Warner CO_2 bill, which is before Congress. The provided language specifically calls for "Section 1425-like" primacy delegation authority for wells that inject CO_2 for sequestration purposes. (Montana's current Class II delegation is under the existing Section 1425 of the Safe Drinking Water Act.)

As noted, the EPA can authorize states to implement the UIC program. If a state does not apply for and obtain primacy, the EPA implements the program through regional offices. Native American tribes follow the same rules for primacy. In Montana, the Fort Peck Tribes have applied for Class II primacy, but it has not been delegated by EPA.

EPA grant money is available for the UIC program; however, States operating a Class V program often complain about the total lack of resources to regulate same.

The Class II grant for the MBOGC is usually around $100,000 per year. The total grant available nationwide is about $10 million and hasn't been changed for years.

Money is generally allocated to primacy states based on the number of injection wells.

MBOGC's annual injection fee is $200 per well; the statutory maximum for the fee is $300 per well per year. The Board may change the fee by Rule. There are about 1,000 injection wells under the Board's regulation.

MBOGC's submitted a primacy application for Class II wells following the 1987 legislature, which was ultimately rejected by EPA. The Board once again became interested in obtaining a primacy delegation in the early 1990's and using the services of an experienced UIC consultant, prepared and submitted an application to EPA Region 8 in October of 1992. This primacy application, after much negotiation and Board rule changes to satisfy the program requirements, was approved in Nov of 1996.

2. Montana Climate Change Advisory Committee recommendations -- Agency oversight

The IOGCC Task Force recognized that most states were not prepared to propose a regulatory structure to deal with CO_2 Geologic Sequestration at the time the Task Force produced its first report (2005). At this point some states are actively considering a regulatory structure, but only a handful have passed substantive law. The Task Force felt that the oil and gas agencies could move more quickly than other state agencies to fill the regulatory gap should the need arise. The use of the UIC program to fill the injection well operation slice of the regulatory pie complicates the process; however the statutory authority to implement the program was a major review requirement for EPA's UIC delegation to the Board in 1996. An official Attorney General's opinion supporting the Board's authority was required prior to program delegation.

It remains to be seen if would be easier for EPA to delegate CO_2 regulation to an existing UIC program and how much additional support documentation and program elements are required.

Section 2. Definitions

The definitions in the model statute are relatively few, and fairly general. The definitions in the model rules are more specific and may be useful to review for possible inclusion in any proposed statute; however there are some problems with the model rules definitions (e.g.: Definition of "USDW" is not compatible with the existing EPA definition).

Section 3. Approval, record or order, certificate -- General requirements

1. Uncertainty about federal guidelines

Currently, the EPA looks to be pursuing rulemaking under the Safe Drinking Water Act (UIC) for sequestration. Congress also has several variations of proposed legislation, which could change the direction, or provide a whole new statutory framework. Presumably, the mechanics of injection will still fall under the SDWA structure.

2. Montana Oil and Gas law as a comparison

In natural gas law, the seismic exploration requirements provide for permits from the County Clerk and Recorder, Bonds held by the Secretary of State and enforcement by the County Attorneys. The Board of Oil and Gas has responsibility for proper plugging of shot holes, cleanup and safe distances from houses and other structures.

Section 4. Storage Project permitting – protections

1. Montana oil and gas law as a comparison

Title 82, Chapter 11 reflect the changes made to facilitate the UIC program primacy application, particularly the substantial civil and criminal penalty provisions. IOGCC Model Statute may not address these particular provisions, because existing state statutes probably already make provision for enforcement activities.

2. Hazardous waste vs. commodity

Industrial waste disposal, including hazardous waste, is covered under the Class I program. There are no Class I wells in Montana.

3. Water Quality considerations in Montana

The modifications were made to 82-11(MCA) in 1987 do address the "overarching protectiveness standard" EPA speaks of. The Administrative rules adopted under the statute also address protection of Underground Sources of Drinking Water. Presumably any agency capable of obtaining a primacy delegation would either have protective language in statute or could (if granted the authority) adopt rules meeting protectiveness requirements.

Section 5. Eminent domain or other authority

1. Underground gas storage reservoirs in Montana

Siting a project is probably the single most important aspect of underground storage. The storage operator (in the case of natural gas) has a very strong economic incentive to insure the selected reservoir will, indeed, hold natural gas and allow it to be delivered back when needed. There is a somewhat different set of economic circumstances involved with disposal of CO_2.

Current storage statutes limit the use of eminent domain to a "public utility." The Legislature may need to consider who it wishes to authorize to use eminent domain for CO_2 storage/sequestration.

Currently the district court determines much of the procedural needs to invoke eminent domain for gas storage. For example, the current law does not specify a percentage of the (mineral) rights that need to be acquired voluntarily before the court can grant eminent domain for the non-voluntary interests.

Section 6. Carbon Dioxide Storage Facility Trust Fund

1. Oil and gas production damage mitigation account

The production damage mitigation account was proposed to be an "orphan well" account; however, the full funding was not appropriated. Instead, the fund was established as an emergency account and the "orphan well" program is funded from two priority grants in the Reclamation and Development Grant Program administered by DNRC. ($600,00 per biennium)

2. Fee that meets future long-term needs

Proper siting of proposed CO_2 storage reduces substantially the risk of leaks or migration and therefore the subsequent need for long-term monitoring , sampling etc. Under the UIC program, great emphasis is placed on finding and correcting potential paths of fluid migration. Most of these pathways are in improperly completed or poorly plugged wells within the "area of review" around each injector or the injection project. Studies of risks associated with injection indicate most failures are likely to occur during the active injection, and risks are greatly reduced after injection ceases, and are even lower after pressure equilibrium is gained in the injection zone(s).

Section 7. Administration expenses

1. Oil and gas privilege and license tax

Privilege and license tax is the primary funding source for the MBOGC. The tax rate is set by the Board and is currently set at 30% of the maximum, reflecting both increased prices and volume of oil produced.

2. Oil and gas fees

The Board intends that the UIC program be self-funded without significant costs being absorbed by the privilege and license tax. The per well annual injection fee along with the annual EPA operating grant are sufficient to fund the program. The current grant is about $100,000 per year, and the annual injection fee (currently $200/well) generates about $200,000 per year. The UIC program has one FTE professional assigned as the program director. Other staff allocate time based on UIC duties they perform. Total personnel costs are roughly equivalent to 3.5 to 4 FTE, other than the UIC director, most of the personnel costs and travel/transportation costs are associated with field inspections.

Section 8. Liability Release

1. Precedent

MBOGC does assume it has the responsibility for re-plugging or reclamation of improperly plugged and abandoned wells if the operator cannot be found or refuses to perform the work. Many of the old wells the Board plugs under its authority are "pre-regulatory" wells that were abandoned many years ago, and often by operators no longer in business. Regardless of ownership, the Board will address priority well plugging and cleanup, using the Damage Mitigation Account, RDGP grant funds, and the Emergency Environmental Contingency account as appropriate. The Board has successfully recovered costs in cases of existing operators in non-compliance.

Section 9. Cooperative Agreements

MBOGC currently has a cooperative agreement with BLM on spacing and pooling issues on federal and Indian lands. The MBOGC also has a cooperative agreement with EPA as part of its primacy package.

MEMO

DATE: December 21, 2007

TO: Sonja Nowakowski

FROM: Bonnie Lovelace, Chief, Water Protection Bureau

Comments on IOGCC model rules and report for Carbon Capture and geologic sequestration

1. Your analysis is well done and addresses the major issues associated with development of public policy for this practice.

2. The EPA analysis through the Office of Groundwater and Drinking Water identifies a number of weaknesses in the model rules. These are all relevant to proper regulation and protection of public health, safety and the environment. Further, they address the need for public involvement processes typical of such major public policy decisions.

3. The IOGCC stance that CO2 capture and sequestration should be treated **solely** as a commodity lacks the reality consideration directly addressed before the ETIC, that the oil and gas industry cannot use all the possible CO2 that could be sequestered. Therefore, some portion of it would actually be a waste.

4. The IOGCC suggestion that "nothing would be achieved by regarding CO2 geologic storage as a regulatory protection solution to a waste problem" ignores very real issues of environmental protection and public health and safety. Further, the IOGCC discusses liabilities and closure of sites, but sees no value in addressing these factors. In fact, the report is liberally peppered with statements that suggest further work by states in resolving issues: "ultimately it will be up to the State Regulatory Agency to decide what is and what is not suitable to long-term geologic storage" and "Given that the state is the proposed "caretaker" and responsible party during the Post-Closure Period, the Task Force did not address monitoring and related issues..." All this is concluded while admitting that security and leak detection are necessary.

5. The IOGCC report did focus on sequestering CO2 in such a way that it does not affect drinking water supplies. While the EPA identified valid issues with this attempt that need to be addressed, there are additional considerations. In Montana, if some Class III waters and Class IV waters were targeted, nondegradation regulation would not apply, thus limiting existing regulatory requirements. However, the role of the Water Quality Act would need clarification in any final solution. Currently, the only discharges to groundwater permitted pursuant to the safe drinking water act (UIC*=Underground Injection Control; contains 5 classes*footnote) exempted (75-5-401 (5) (a)) from groundwater permitting are Class II, oil and gas activity. If another class of UIC permit applies to this activity, it is not exempt. Therefore, dual permitting

would apply, but only to that portion of the activity currently regulated under the Water Quality Act (not engineering, site selection and other activities). See detailed analysis below for Montana Water Quality Act (MTWQA) considerations.

6. The IOGCC report does little to address the quality issues associated with the proposed practices. It identifies a 95% purity of CO2 and acknowledges such pollutants as H2S, NOx and SO2. Many other potential pollutants are not acknowledged. In Montana, discharge of carcinogens and toxics would be a major consideration under current law.

I am attaching a technical discussion of the applicability of the Montana Water Quality Act to geologic carbon sequestration. Contact me if you have questions.

*footnote: The DEQ analyzed the UIC program in 1997 to consider whether or not to seek primacy for the Class V- shallow injection well- portion. For a number of reasons, the DEQ chose not to pursue delegation. Chief amongst the reasons were: EPA would not approve just the one class, they insisted that DEQ take on all classes not already delegated (Class II), at that time, 32 different types of permits existed in the Class V program alone and the rules were changing significantly, DEQ management did not believe that it was a good time to seek delegation; and DEQ management believed that EPA would not provide sufficient resources to manage the programs. Because the Water Quality Act requires fees for our permits, we believed that requiring fee payment from all the small sources identified in the UIC program would be a burden to operators such as dry cleaners and garage shops.

Detailed MTWQA considerations, regulatory framework and existing regulation applicability:

Regardless of classification of the injectate as hazardous waste or a commodity the definition of an industrial waste in the MTWQA likely applies. The Act, via the Montana Groundwater Pollution Control System (MGWPCS) classifies state waters, defines applicable standards and beneficial uses for each class, and regulates discharges of industrial wastes to state water independent of the Federal UIC program and SDWA. The State may not permit disposal of hazardous waste to state water via the MGWPCS program. Ultimately, MT WQA and MGWPCS would have jurisdiction and would need to be modified or included by reference. Modification of the MTWQA to exclude its applicability and jurisdiction in this case may impact jurisdiction and/or authority of the Act to regulate other currently regulated activities, therefore if this happens, careful word smithing would be required.

Underground Sources of Drinking Water is defined in the IOGCC model regulations as an "aquifer or its portion which is a public water supply…….. contains fewer than 10,000 mg/L TDS …"

The MT WQA classifies state ground water based on specific conductivity (SC) in microSiemen/cm (uS/cm). USGS (1989) published a numeric equation that can be used to estimate SC based on TDS. The equation is KA=S, where K is specific conductance in umohs/cm (1umoh/cm is equivalent to 1uS/cm), S is dissolved solids in mg/L and A is a numeric constant that ranges from 0.54 to 0.96. Rearranging the equation to solve for K yields K=S/A. Using the given range of values for A, K ranges from 18,518 to 10,416 umohs/cm at a TDS of 10,000mg/L.

Strictly speaking the relationship between EC and TDS is water specific and is affected by the complexity and diversity of dissolved parameters. Nonetheless, the equation provides a quick and very rough numeric tool to facilitate discussion relevant to the model statute.

- Based on the state's groundwater classification scheme, waters with TDS greater than 10,000 mg/L would be considered Class III (2500 – 15,000umohs/cm) or Class IV ground water (>15,000mS/cm). Class III groundwaters are to be maintained suitable for irrigation of salt tolerant crops, some commercial and industrial purposes and drinking water for some livestock and wildlife. Therefore, a person may not cause a violation of the state's numeric water quality standards (DEQ-7) except those for Nitrate. The standard for N is adjusted to 50 mg/L.

- Class IV waters are to be maintained suitable for some industrial and commercial uses. Therefore, a person may not cause a violation of DEQ-7 standards for parameters listed as carcinogens. Mercury is a toxic. Class III and IV groundwaters are not high quality waters of the state, therefore, water quality nondegradation policy would not apply and this activity could be added to MCA 75-5-317 (nonsignificant activities) provided it is permitted in accordance w/ the proposed statute and associated rules to be developed.

Ultimately the definition of USDW and its use in the IOGCC model statute as a metric of types of waters to be protected is too narrow and does not appear to be protective of the quality of state water in a manner that is consistent and/or complimentary to the MT WQA.

Many of the model statute programmatic provisions are similar to the WQ discharge permitting program; however, the model fails to specifically delineate and/or contain:

·Specific prohibitions of impacts to state water quality or other environmental resources,
·Signatory requirements for applications, permits and reports,
·Enforcement of chapter,
·Authority to deny a permit
·Provisions for contestation of permit or authorization.

Overview: EPA Proposed Geological Sequestration Requirements

On July 15, 2008 the Environmental Protection Agency (EPA) proposed new requirements for geologic sequestration of carbon dioxide. The agency is seeking public comment on the proposed rule for the next 120 days. The rule is not expected to be final until late 2010 or 2011.

Underground fluid injection is currently regulated through EPA's Underground Injection and Control (UIC) Program. The program is part of the Safe Drinking Water Act (SDWA) established to protect underground water resources from contamination. Based on that system, there are five classes of wells for waste injection. Pilot sequestration projects are currently regulated under Class V.

A few highlights of the EPA's proposed rule:

- The proposed rule establishes a new class of injection well -- Class VI -- and the technical criteria for geological site characterization, well construction and operation, mechanical integrity and monitoring of wells, well plugging, post-injection site care, and site closure requirements.

- The rules are proposed as the necessary steps for protecting underground drinking water, and, in many instances would prevent migration of CO_2 to the surface. The Safe Drinking Water Act does not provide authority to develop all areas of regulation related to sequestration. The proposed rule does not determine property rights, discuss capture and transport of carbon dioxide, transfer liability from one entity to another, or discuss accounting for greenhouse gas reductions.

- The EPA currently regulates both pollutants and commodities under the UIC program. The proposed rule does not address the status of carbon dioxide as a pollutant or commodity. The proposal, however, includes significant statements on the subject:

    - The proposal recognizes that in most cases CO_2 that is captured will contain some impurities. Those levels are expected to be low. However, the report notes, "EPA cannot make a categorical determination as to whether injected CO_2 is hazardous under RCRA," the Resource Conservation and Recovery Act. Under the proposal, owners and operators will have to characterize their CO_2 stream as part of the permit applications to determine whether it is considered hazardous. If it is considered hazardous, the more stringent Class I well requirements will apply.
    - The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), better known as Superfund, also is addressed.

The proposal recognizes that CO_2 is not a hazardous substance under CERCLA, but notes that a CO_2 stream from a power plant could contain mercury or other hazardous substances. "Whether or not there is a 'hazardous substance' that may result in CERCLA liability from a sequestration facility depends entirely on the make-up of the specific CO_2 stream and of the environmental media in which it is stored. . . As applicable, a determination of liability would be made on a case-by-case basis in Federal courts in response to claims . . ."

- The proposal discusses, to some degree, long-term liability for geologic sequestration operations:
    - The EPA is proposing using a combination of a fixed timeframe and a performance standard for the post-injection timeframe. The tentative proposal for post-injection monitoring is 50 years, allowing a program director with some additional latitude in that area.
    - The proposal requires that owners and operators demonstrate and maintain financial responsibility and have the resources for activities related to closing and remediating a site. The proposal does not discuss transfer of financial responsibility to other entities or creation of a third party financial mechanism, where the EPA or another entity would be the trustee.
    - "Trust responsibility for potential impacts to USDWs remains with the owner or operator indefinitely under current SDWA provisions." Because responsibility for long-term care is important to sequestration, the EPA is compiling additional information in this area.

- The proposal is clear that States that wish to retain primacy over these new wells, Class VI wells, will need to promulgate regulations that are at least as stringent as those finalized by the EPA. However, this appears to be most directed at states that currently have primacy over ALL well classes (I-V). The State of Montana currently only has primacy over Class II wells, and on the subject of parceling out primacy over just the new Class VI wells, the report states, "There may be benefits to parsing out primacy for Class VI wells, however, EPA has not made a decision on this."

- The requirements in the proposal would not specifically apply to Class II injection wells or Class V experimental wells. Injection of CO_2 for enhance oil and gas recovery, for example, as long as production is occurring, would be permitted under Class II.

2007 CO_2-related legislation

HB 3 "Jobs and Energy Development Incentives Act"// Approved Special Session// Rep. Llew Jones.

Provides permanent property tax rate reductions from 12 percent to 3 percent of market value for new investments in transmission lines for "clean" electricity, "clean" liquid and carbon sequestration pipelines. Property taxes on new generation technology with sequestration goes from 6 percent to 3 percent. New DC converter stations serving two regional power grids go from 6 percent to 2.25 percent. Nonpermanent incentives from 3 percent to 1.5 percent are available for new investments in biodiesel, biomass and other defined technologies.

HB 25 Revise Electric Industry Restructuring laws// Approved Regular Session// Rep. Alan Olson

The "Electric Utility Industry Generation Reintegration Act" includes a carbon sequestration component. Until the state or federal government has adopted uniform, applicable standards for the capture and sequestration of carbon dioxide, HB 25 prohibits the PSC from approving electric generating units primarily fueled by coal unless a minimum of 50 percent of the CO_2 produced by the facility is captured and sequestered. Natural gas plants also must include cost-effective carbon offsets.

The bill applies only to electric generating units constructed after January 1, 2007. Montana joins California, Oregon, and Washington as states that have adopted a CO_2 emissions performance standard for electric generating units.

HB 715 Clean coal and renewable research grant money//Approved Regular Session// Rep. Alan Olson

Requires that 30% of the Research and Commercialization Expendable Trust be used for clean coal and renewable energy research and development.

SB 449 Fuel efficiency standards for certain state-owned vehicles.// Approved Regular Session//Sen. Kim Gillan

Requires fuel efficiency standards for certain state-owned vehicles. Requires state agencies to develop a plan for reducing fuel and travel.

HB 24 Revise laws related to carbon dioxide for energy purposes//VOID//Rep. Harry Klock

Provides common carrier status to pipelines carrying carbon dioxide that is transported for permanent sequestration in a geological formation.

This bill, however, was contingent upon the passage and approval of SB 218, which authorized the Board of Environmental Review to adopt rules establishing a carbon sequestration program and permit system. SB 218 was tabled, so HB 24 is void.

HB 55 Carbon sequestration -- ecosystem services leasing and licensing. Tabled by House Natural Resources//Rep. Kevin Furey

Authorized the Department of Natural Resources and Conservation to lease or license state trust lands for carbon sequestration or other ecosystem services such as open space or biodiversity. The board of land commissioners was charged with promulgating rules for this program.

HB 227 Create carbon sequestration loan program. Tabled by House Appropriations//Rep. Ron Erickson

Established a carbon sequestration revolving loan account administered by the DNRC. Funded by interest income off a portion of the interest on coal severance taxes. Funds from the loan account would be used to provide loans to individuals, small businesses, units of local government, units of the university system, and nonprofit organizations for the purpose of terrestrial carbon sequestration. The amount of a loan could not exceed $50,000, and the loan must be repaid within 10 years

HB 282 Sequestration to slow global warming. Tabled by House Natural Resources//Rep. Ron Erickson

Required all coal-fired electrical generation facilities or synthetic fuel facilities that file construction permits with the DEQ to capture CO_2 at the site and permanently store it in a geological formation or provide verification that 100 percent of the carbon emissions would be offset.

HB 753 Montana global warming solutions act. Tabled by House Natural Resources//Rep. Betsy Hands

Required the DEQ to develop and the Board of Environmental Review to adopt a global warming program for the State of Montana that included identification of historical and current sources of greenhouse gas emissions. A plan also would have been developed to reduce emissions to 1990 levels.

Modeled after legislation in California, it also would have allowed the BER to adopt a schedule of fees that would be paid by greenhouse gas emission sources.

HB 828 Study carbon sequestration. Died in process// Rep. Alan Olson

Outlined a study of carbon sequestration issues in Montana and required the Energy and Telecommunications Interim Committee to complete such a study.

HJ 60 Study climate change. Tabled by Federal Relations, Energy and Telecommunications// Rep. Sue Dickenson

Required a study that would review existing federal and state regulations related to greenhouse gas emissions, energy efficiency, renewable energy, and tax incentives. Included review and analysis of findings by Governor's Climate Change Advisory Council.

SB 105 Tax break for equipment to sequester carbon. Tabled House Taxation// Sen. Greg Lind

Placed equipment specifically used for carbon sequestration in class 5 (3 percent) and made such property exempt from taxation for three years after it becomes operational.

SB 218 Sequestration standards for carbon dioxide. Tabled by House Natural Resources// Sen. Greg Lind

Required the state to develop a new program to monitor underground injection of carbon dioxide. The Board of Environmental Review would be charged with adopting rules to administer the program. It also created a special revenue fund with fees and penalties to support the program.

SJ 20 Carbon reduction timeline. Tabled in House Natural Resources// Sen. Mike Cooney

Urged Congress to enact a mandatory and science-and-market based limit on overall limits of greenhouse gas emissions and to provide incentives for development of energy efficiency and renewable energy programs.

LC 1469 Carbon Dioxide as pollutant. Not introduced//Requested by Rep. Ron Erickson

Revised the definitions of "air pollutants" under the Clean Air Act of Montana to include CO_2. Required the BER to establish CO_2 emission levels.

There were multiple additional bills considered that examined fuel efficiency standards, building efficiency requirements, overall energy efficiency and auditing, renewable energy, and energy conservation related to climate change. The bills listed here focus specifically on carbon sequestration and greenhouse gas regulatory issues.

38.5.8228 MINIMUM FILING REQUIREMENTS FOR ~~DSU~~ UTILITY APPLICATIONS FOR ~~ADVANCED~~ APPROVAL OF ELECTRICITY SUPPLY RESOURCES (1) If a ~~DSU~~ utility intends to file an application for ~~advanced~~ approval of a ~~power purchase agreement~~ electricity supply resource that is not yet procured, it must notify the commission and the Montana Consumer Counsel far enough in advance of filing to accommodate adequate pre-filing communication. If the ~~power purchase contract~~ resource will result from a competitive solicitation, notice must be provided before the ~~DSU~~ utility issues a request for proposals.

(2) An application by a ~~DSU~~ utility for ~~advanced~~ approval of a ~~power purchase agreement~~ electricity supply resource must ~~incorporate by reference the DSU's most recent long-term resource plan, must include the DSU's most recent three year action plan, and must provide~~ include, as applicable:

~~(a) a complete explanation and justification of all changes, if any, to the DSU's most recent long-term resource plan and three year action plan, including how the DSU has responded to all commission-written comments on the long-term plan;~~

~~(b) a copy of the proposed power purchase agreement, including all appendices and attachments, if any;~~

~~(c) testimony and supporting work papers demonstrating the need for the resource/electricity supply product(s) underlying the power purchase agreement;~~

~~(d) testimony and supporting work papers demonstrating that the resource/electricity supply product(s) underlying the power purchase agreement:~~

~~(i) is in the public interest;~~

~~(ii) will facilitate achieving the goals and objectives of these guidelines; and~~

~~(iii) complies with all resource procurement guidelines in this subchapter;~~

~~(e) if the power purchase agreement resulted from a competitive solicitation, copies of:~~

~~(i) the DSU's request for proposals;~~

~~(ii) all bids received;~~

~~(iii) testimony and work papers demonstrating all due diligence and bid evaluation conducted by the DSU, including the application of bid rating mechanisms and management judgment;~~

~~(f) testimony and supporting work papers demonstrating that the price, term and quantity associated with the power purchase agreement are reasonable and in the public interest;~~

~~(g) thorough explanation and justification for any other terms in the power purchase agreement for which the DSU is requesting advanced approval;~~

~~(h) testimony describing all pre-filing communication;~~

~~(i) thorough explanation and justification for any request for a commission decision less than 180 days from the date the DSU's application is filed including a specific plan for ensuring adequate due process; and~~

~~(j) testimony and supporting documentation related to any advice received from the DSU's stakeholder advisory committee regarding the power purchase agreement or the underlying resource/electricity product(s) and actions taken or not taken by the DSU in response to such advice.~~

(a) a complete and thorough explanation and justification of all changes to the utility's most recent long-term resource plan and three year action plan, including how the utility has responded to all commission written comments;

(b) a statement explaining whether the application pertains to a power purchase agreement with an existing generating resource, a lease or acquisition of an equity interest in a new or existing generating resource, or a power purchase agreement for which approval will result in construction of a new generating resource;

(c) testimony and supporting work papers describing the resource and stating the facts (not conclusory statements) that show that acquiring the resource is in the public interest and is consistent with the requirements in 69-3-201 and 69-8-419, MCA, the utility's most recent long-term resource plan (as modified by (a)), and these rules;

(d) testimony and supporting work papers demonstrating the utility's estimates of the cost of the resource compared to the cost of each alternative resource the utility considered and all relevant functional differences between each alternative;

(e) testimony and supporting work papers demonstrating the implementation of cost-effective carbon offsets for a electricity supply resource fueled primarily by natural or synthetic gas constructed after January 1, 2007;

(f) testimony and supporting work papers demonstrating the capture and sequestration of 50% of the carbon dioxide produced by a electricity supply resource fueled primarily by coal constructed after January 1, 2007;

(g) a copy of the proposed power purchase agreement, including all appendices and attachments;

(h) a copy of any request for proposals issued in connection with acquisition of the electricity supply resource;

(i) testimony and supporting work papers comparing all bids received in connection with any request for proposals with respect to price and non price factors;

(j) testimony and work papers describing all due diligence and bid evaluation in connection with any request for proposals, including the ranking of bids and reliance on management judgment;

(k) thorough explanation and justification for any terms, other than price, quantity and contract duration, in a power purchase agreement for which the utility is requesting approval;

(l) a complete description of each aspect of the resource for which the utility requests approval;

(m) testimony and supporting documentation describing all pre-filing communication; and

(n) testimony and supporting documentation related to any advice received from the utility's stakeholder advisory committee regarding the proposed resource and actions taken or not taken by the utility in response to such advice.

AUTH: 69-8-403, 69-8-419, MCA
IMP: 69-8-403, 69-8-419, MCA

REASON: Ch. 491, L. 2007 repealed electric customer choice for small customers and eliminated the definition of and references to default supply. The change is necessary to conform the rule to the revised statutes. Additionally, the ability of a utility to request approval of rate-based assets requires revision to the minimum filing requirements.

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Energy and Telecommunications Interim Committee

60th Montana Legislature

October 24, 2007

TO: Energy and Telecommunications Interim Committee (ETIC) Members

FR: Todd Everts, ETIC Legal Staff

RE: Analysis of Geologic Storage of Carbon and Storage Ownership Interest Issues in Montana

Background

As a part of the ETIC's over-all review and analysis of the policy issues associated with sequestration of carbon in Montana, the ETIC requested (via the adoption of its Work Plan), an analysis of the issues associated with the carbon capture and geologic storage and surface and subsurface ownership interests.[1] The purpose of this memorandum is to analyze those issues within the Montana context and in light of a recent U.S. Environmental Protection Agency announcement.

General Overview

Whether you agree or disagree with the premise that climate change is occurring and that elevated levels of atmospheric carbon dioxide (CO_2) may be one of the causes of climate change, there is no question that many individuals and groups in the governmental, industrial, public interest, and private sectors throughout the country and the world have become intensely interested in the possibilities surrounding the mitigation of CO_2 emissions.[2] One of many technologies being evaluated is CO_2 capture and geologic sequestration (CCGS). Simply put, CCGS is the process of capturing CO_2 emitted from major sources such as power plants, transporting the CO_2 to an injection site, and then injecting the CO_2 into deep geological formations for long-term storage. Although seemingly simple to describe, CCGS raises a number of technical, legal, and

[1] See ETIC Work Plan 2007-2008, page 3, October 17, 2007.

[2] See Elizabeth J. Wilson & Mark A. de Figueirdo, Geologic Carbon Dioxide Sequestration: An Analysis of Subsurface Property Law, 36 ELR 10114, 1 (2006); Kate Robertson, Jette Findsen, & Steve Messner, International Carbon Capture and Storage Projects Overcoming Legal Barriers, DOE/NETL 2006/1236

regulatory policy issues that need to be addressed prior to wide-scale implementation. Issues include surface and subsurface property interests; impacts on other minerals and water; site suitability requirements; ownership of the injected CO2;, classification of CO_2; operational and long-term liability, and state, federal, and international CCGS regulatory jurisdiction; just to name a few.[3]

The uncertainty surrounding these issues has been the impetus for a number of recent state, interstate, federal, and international CCGS initiatives.[4] The ultimate goal of many of these initiatives is to create an environment of regulatory certainty that facilitates CCGS investment and implementation and that minimizes all associated risks. With the recent October 11, 2007, announcement from the U.S. Environmental Protection Agency (EPA) that it plans to develop rules governing underground injection of CO_2, it appears that in the United States the EPA and not the individual states, will take the lead role in regulating CCGS.[5] The EPA expects to issue the proposed rules by the summer of 2008.[6] Obviously, it is unclear what these rules will look like and how much of a role states like Montana will play in CCGS regulation.

However, regardless of the outcome of the EPA regulations, states like Montana will play a key role in resolving certain legal and policy CCGS issues regarding property rights. One of those critical state issues is the legal uncertainty surrounding surface and subsurface property interests in the CCGS process.

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[3] See: Wilson et. al, supra note 2; Robertson et. al. supra note 2; Brian J. McPherson, Congressional Testimony before the U.S. Senate Subcommittee on Energy, Natural Resources, and Infrastructure on Carbon Capture, Sequestration and Enhanced Oil Recovery: Potential Opportunities and Barriers in the Context of Geologic and Regional Factors, pages 6 and 7 (April 26, 2007); Jeffery P. Price, Policy, Legal and Regulatory Issues in Carbon Capture and Storage, PowerPoint Presentation, CSLF Capacity Workshop, Pittsburgh, Pennsylvania, pages 8 and 9, (May 2007); Interstate Oil and Gas Compact Commission Task force on Carbon Capture and Geologic Storage, A Legal and Regulatory Guide for States and Provinces, (September 25, 2007); Ray Purdy and Richard Macrory, Geological Carbon Sequestration: Critical Legal Issues, Tyndall Centre for Climate Change Research, (January 2004); Carbon Sequestration Leadership Forum Policy Group Report from the Legal, Regulatory, and Financial Issues Task Force, Considerations on Legal Issues for Carbon Dioxide Capture and Storage Projects, CSLF-P-2004-14C (August 13, 2004); W.J. Lenstra & B.C.W. van Engelnburg, Legal and Policy Aspects: Impact on the Development of CO2 Storage, Ministry of Environment, The Netherlands, IPCC Workshop on Carbon Dioxide Capture and Storage (2004); and John Bradshaw, Pore Space Ownership and Liabilities in a Geological Storage Regime: Some Australian Perspectives, PowerPoint Presentation to IPIECA, (June 20, 2007.

[4] Id. at 3

[5] CarbonControlNews.com, EPA Rulemaking On CO2 Storage May Circumvent State Efforts (Posted October 12, 2007).

[6] Id at 5.

A Limited Analysis of Surface and Subsurface Property Interests and CCGS

In order to capture, transport, and store CO_2, the right to use and acquire property interests both on the land's surface and subsurface is a fundamental prerequisite. Multiple property interests are at play within the context of CCGS, including storage space property rights, access to storage rights, ownership rights in other minerals and water, and ownership of the injected gas.[7] Along with these property interests comes multiple players including surface owners, mineral owners, mineral lessees, state and federal governmental agencies, tribal governments, and public and private constituencies.

So what is Montana's potential role in the complex morass of interests and players? Again, with EPA taking a lead regulatory role that won't be defined until rules are proposed in the summer of 2008 and likely adopted in late 2009 or early 2010, the issues that Montana can address are likely limited to

> (1) clarifying the relationship of property interests associated with CO_2 storage; and
>
> (2) clarifying whether Montana's eminent domain powers should be used to acquire underground reservoirs for CO_2 storage.[8]

In order to clarify the property interests associated with CO_2 storage, a critical question has to be answered:

> *Are there legally recognized property interests in the pore spaces that may be used for CO_2 storage and if so, who owns those property interests?*

A number of legal commentators have concluded that if states use natural gas storage law as a model in clarifying property interests associated with CO_2 injection and storage, then there are legally recognized property interests in the subsurface pore spaces and that the general preponderance of the case law concludes that the surface estate owner also owns the subsurface storage pore space.[9] In addition, mineral owners could have affected future interests. Title to the natural gas remains with the storage operator. Commentators also note that in the development of natural gas storage law, both surface and mineral rights holders are included in terms of compensation and that

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[7] Supra note 1.

[8] Even Montana's ability to address these issues may be suspect if EPA designates the injection of CO2 as the disposal of a waste product as opposed to storage of a useful product.

[9] Supra notes 1 and 4.

mineral production supercedes storage rights.[10] Montana law affirms these notions of compensation and the dominance of mineral production.[11] If the Montana Legislature decides to adopt CCGS policy regarding the interrelationships between the surface owners, mineral owners, and the storage operator, the provisions of Title 82, chapters 10 and 11, may be a helpful statutory starting point.

Under Montana law, the power of eminent domain is granted for natural gas storage projects.[12] Although there was an attempt made in the 2007 Legislature to extend eminent domain powers for CO_2 transmission and geologic sequestration, that attempt failed.[13] Montana law declares that the underground storage of natural gas is in the "public interest" because it promotes conservation of a valuable commodity and permits building of reserves for the orderly distribution and stable markets.[14]

Obviously, the use of eminent domain for any activity is a controversial proposition. If the Montana Legislature were to make the policy decision to extend the power of eminent domain to CO_2 storage reservoirs, public interest and welfare criteria would have to be established in law and site suitability requirements not unlike the certification process in provided for in 82-10-304 and 82-10-305, MCA would have to be enacted.

Conclusion

The bulk of the analysis of this memorandum prior to the announcement of the EPA, would have involved analyzing issues such as immediate and long-term liability among the competing interests, regulatory siting and permitting, classification of CO2, resource protection (water and minerals), and long term monitoring. Until the EPA provides guidance on these issues, state policy initiatives are left in limbo.

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[10] Id.

[11] See 70-30-105 and 82-10-303, MCA

[12] See 70-30-102(43), MCA and 82-10-303, MCA

[13] House Bill 24 (2007 Session)

[14] See 82-10-302(2), MCA

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